Wichita Falls Municipal Airport
Master Plan Update

Draft Report
(Pending City Council Acceptance and FAA Review)

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EXECUTIVE SUMMARY

EXECUTIVE SUMMARY

PREFACE

Wichita Falls Municipal Airport (SPS) is a key element of the transportation system that serves residents, businesses, and visitors to the Wichita Falls region. The Airport's facilities enable access to the National Air Transportation System through scheduled and non-scheduled commercial airline service. These services facilitate business and leisure travel for residents and employees, as well as military personnel at Sheppard Air Force Base. The Airport also provides suitable facilities and services to support general aviation aircraft that require greater runway length and instrument approach capabilities than are available at Kickapoo Downtown Airport. Finally, the Airport supports air cargo operations that facilitate local commerce.

To ensure that the Airport continues to meet the needs of the travelling public, an update of the Airport's last Master Plan, which was conducted in 1974, was undertaken and is presented in the following pages. This Master Plan Update provides airport management with a guide to the capital improvements needed to serve forecasted levels of passenger and aircraft operations through the year 2030. The Master Plan Update focuses on the need and concept for, and location of, a new passenger terminal. The existing passenger terminal was constructed in 1959 and is in need of replacement due to functional and operational deficiencies.

This Master Plan Update consists of this report and a separate set of Airport Layout Plan (ALP) drawings that depict all proposed development in a formal manner prescribed by the Federal Aviation Administration (FAA). The ALP Drawing Set requires FAA review and approval before the proposed capital improvements shown thereon can become eligible for Federal funding. The ALP drawings ensure that all proposed development is planned in a safe and efficient manner that meets FAA design standards.

This study was conducted in conjunction with an Advisory Committee comprised of representatives from airport tenants, Sheppard Air Force Base, the City of Wichita Falls (the City) Planning Department, the FAA, the Transportation Security Agency (TSA), the Wichita Falls Metropolitan Planning Organization (MPO), airport management, and members of the Aviation Advisory Board. The Advisory Committee reviewed elements of the study as they were produced, and provided input to the study process.

Opportunities for all members of the community to review the results of the study and provide input to the study process were provided through two public information workshops held at key points during the study. These meetings were held in the Wichita Falls Public Library and enabled the public to review study findings and provide input to the study process. Information from the advisory committee meetings and public information workshops are provided in Appendix E.

The resulting Master Plan Update is briefly summarized on the following pages. Readers interested in the full details of the plan should refer to the main body of the report and the appendices that fully explain the rationale for all development proposed herein. Readers may also refer to the ALP Drawing Set for detailed illustrations of the proposed plan.

STUDY FUNDING AND ELEMENTS

This study was financed through a grant from the FAA and Passenger Facility Charges (PFCs) collected on the tickets on revenue passengers departing SPS. The study consisted of the following elements:

- An **Inventory** of existing facilities and operational conditions.
- **Forecasts** of passenger, aircraft operations, and based aircraft.
- An identification of the **Facility Requirements** needed to service future demand and the formulation of a Terminal Space Program.
- The development of **Terminal Concepts** and an evaluation of their potential benefits.
- A refinement of the **Preferred Terminal Concept** to show proposed facilities at a greater level of detail.
- The development of **Airport Plans** that meet FAA requirements for Federal funding.
- The preparation of a **Facilities Implementation Program** that identifies proposed capital improvements, their cost, and their appropriate timing for construction.
- A **Financial Plan** that describes the proposed funding of projects.

STUDY FINDINGS

The Master Plan Update provides the following conclusions and recommendations for consideration by the City Council.

- Existing runway and taxiway pavements are in need of rehabilitation and reconstruction due to long-term wear and deterioration. The Airport is currently implementing a reconstruction program for Runway 17/35.
- The existing passenger terminal suffers from a number of operational and functional problems due to the age of the facility (50+ years) and the manner in which the terminal was expanded over many years. Operational problems include roof leaks, inefficient heating and air conditioning, and electrical problems. Functional problems include insufficient space for all terminal uses and inefficient passenger flows.
- Passenger enplanements are projected to grow at a long-term rate of one percent following a 2-year recovery from the lower levels of passengers experienced during 2009. This conservative forecast estimates that annual passenger enplanements will grow to 59,000 by the year 2030 from their current level of 44,673 in 2009.
- Aircraft based at SPS are expected to grow very little during the planning period. The number of based aircraft is projected to increase to 24 in 2030 from the 21 aircraft that are currently based there. Most of the growth associated with general aviation aircraft is expected to occur at Kickapoo Downtown Airport due to its proximity to the City and its ease of access.

- Existing airfield capacity at Sheppard Air Force Base is sufficient to meet to all projected civilian aircraft operations at SPS.
- Runway lengths, widths, and strengths are more than sufficient to accommodate all civilian aircraft operations. The number of taxiways is sufficient to accommodate efficient movement of aircraft. One taxiway improvement that should be considered is the widening and strengthening of Taxiway "C" to accommodate air carrier aircraft such as the MD-80.
- Navigational aids at Sheppard Air Force Base are sufficient to accommodate all civilian aircraft operations at SPS.
- The existing passenger terminal, which provides approximately 17,500 square feet of space, is inadequate to efficiently serve existing and projected numbers of peak hour passengers. Approximately 37,500 square feet of space is required to meet passenger demand throughout the study period.
- The commercial aircraft parking apron in front of the passenger terminal is adequately sized to accommodate currently scheduled service but is inadequate to accommodate peak loads associated with aircraft diversions from other airports. It is also of inadequate strength to accommodate significant numbers of air carrier aircraft.
- Airport roadways are adequate to meet all existing and projected levels of automobile traffic.
- Long- and short-term public parking requires expansion to meet peak requirements for existing and future levels of activity. The Master Plan Update recommends that short-term parking be expanded to 25 spaces from the current eight and long-term parking be expanded to 281 spaces from the current 187.
- Support facilities such as the firefighting services (which are provided by Sheppard Air Force Base) and fuel storage facilities are adequate to meet existing and future levels of demand.
- Construction of a consolidated rental car service facility should be considered to replace existing facilities that are in poor condition or are situated in locations that are not easily accessible. This facility is also needed to provide space for an additional rental car company.
- Existing general aviation facilities in terms of hangars and aircraft parking apron are adequate to meet existing and future demand. However, the Master Plan Update identifies suitable locations for any future hangar development.
- A new passenger terminal complex is recommended southwest of the existing passenger terminal. This complex would have an aircraft parking apron that could accommodate two regional–size aircraft and one air carrier size aircraft simultaneously, a passenger terminal building that provides 37,500 square feet of space, and associated parking lots for public (308 spaces), employee (43 spaces), and rental car parking (102 spaces).
- The Master Plan Update recommends 12 additional capital improvement projects in addition to the proposed passenger terminal complex. These projects primarily focus on maintaining existing airfield and terminal area pavements in good condition. Rehabilitation and reconstruction of Runway 17/35, Taxiway "C," and all existing aprons in the terminal area are recommended.
- Additional capital improvement projects include the construction of a rental car service facility, security improvements consisting of an access road and fencing, and the demolition of the existing passenger terminal once a new passenger terminal complex has been completed.

RECOMMENDED PLAN

The recommended development plan for SPS was organized into short-, intermediate-, and long-term phases. These phases consist of two consecutive 5-year periods (2010 to 2014 and 2015 to 2019) followed by one 10-year period (2020 to 2029). The projects proposed in each phase are intended to meet demand as they arise or, in the case of pavement rehabilitation, in the order of greatest need. Changes to project scheduling will likely occur in response to changes in funding availability and demand levels, as well as airport management and tenant priorities.

SHORT-TERM (2010 TO 2014) PROJECTS

Project priorities during the short-term include the reconstruction of Runway 17/35 to bring the existing pavement into compliance with FAA standards and correct existing pavement deterioration. Another high-priority pavement project is the rehabilitation of the existing air carrier parking apron. This project will repair cracked panels, seal pavement joints, and improve pavement surfaces. A consolidated rental car service facility is proposed to replace existing facilities that are in poor conditions and require access to secure portions of the airfield. Finally, the preparation of required environmental documentation and the construction of a proposed passenger terminal complex are proposed. The estimated costs of these projects are shown in **Table ES-1**. **Figure ES-1** provides an illustration of projects in the short-, intermediate-, and long-term phases.

TABLE ES-1
SHORT-TERM PROJECTS

Project Number	Project Name	Estimated Cost
1	Reconstruct Runway 17/35 – Phase 1	$4,539,203
2	Reconstruct Runway 17/35 – Phase 2	$5,339,753
3	Rehabilitate Existing Air Carrier Aircraft Parking Apron and Install High-Mast Lighting	$1,716,720
4	Construct Rental Car Service Facility	$324,761
5	Prepare Environmental Documentation for Passenger Terminal	$35,000
6	Construct New Passenger Terminal Complex	$30,259,000
	Total	**$42,214,437**

Source: URS Corporation, 2010.

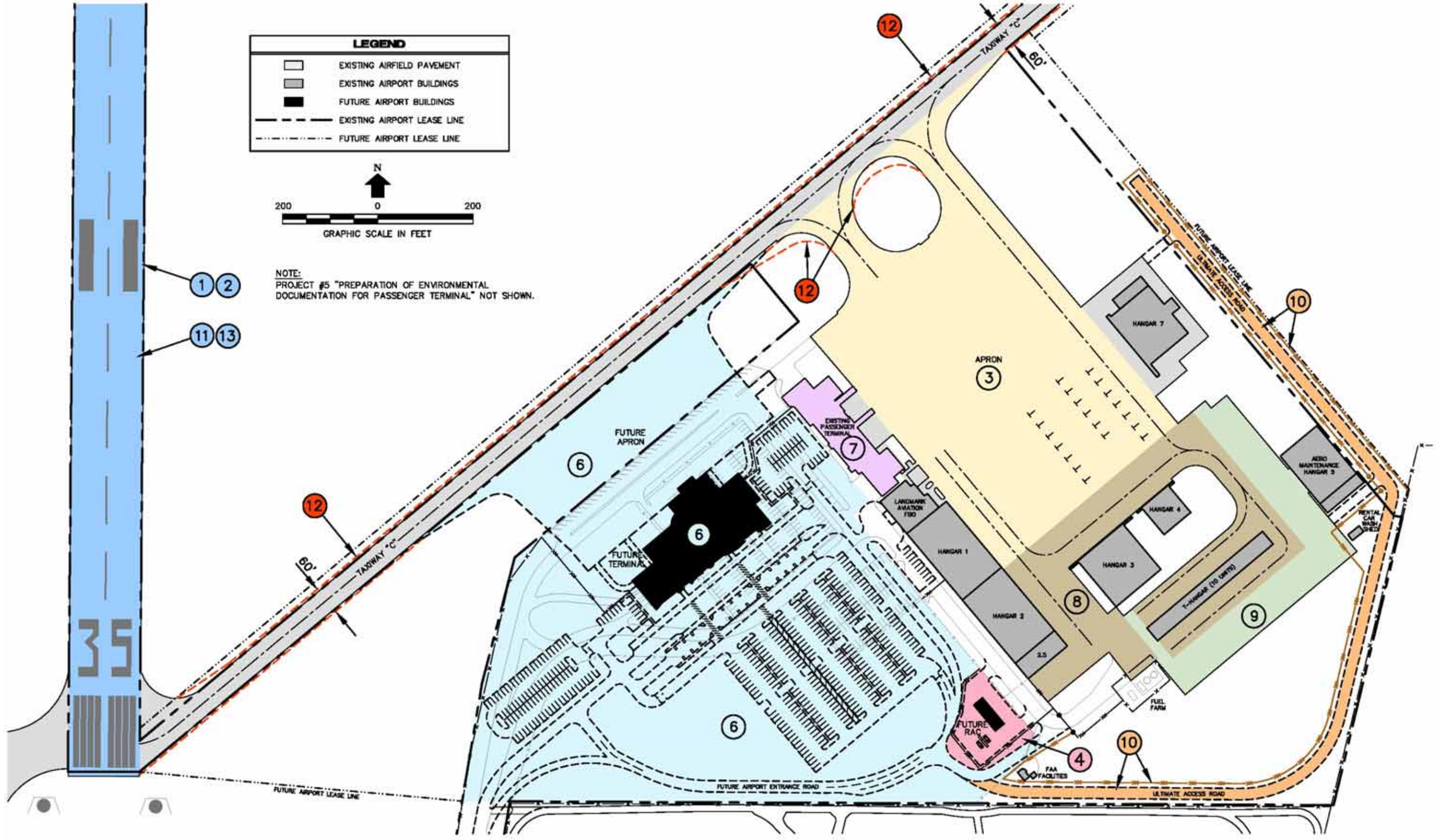


FIGURE ES-1
RECOMMENDED DEVELOPMENT PLAN

INTERMEDIATE-TERM (2015 TO 2019) PROJECTS

Project priorities during the intermediate-term include the demolition of the existing passenger terminal, the rehabilitation and reconstruction of existing aircraft parking aprons, and the implementation of security improvements consisting of a new access road and fencing. Estimated costs for these projects are shown in **Table ES-2**.

TABLE ES-2
INTERMEDIATE-TERM PROJECTS

Project Number	Project Name	Estimated Cost
7	Demolish Existing Passenger Terminal	$577,777
8	Reconstruct Existing General Aviation Aircraft Parking Apron	$2,195,265
9	Rehabilitate Existing General Aviation Aircraft Parking Apron	$343,335
10	Security Improvement (Extend Access Road and Fencing)	$619,041
	Total	**$3,735,418**

Source: URS Corporation, 2010.

LONG-TERM (2020 TO 2029) PROJECTS

Project priorities during the long-term include maintaining Runway 17/35 pavements in good condition and upgrading Taxiway "C" and widening its pavement to 60 feet from its current width of 50 feet. Two pavement projects for Runway 17/35 are indicated for the long-term. The first project consists of a coal tar sealing and crack repair along with a repainting of pavement marking. This project would occur at the beginning of the long-term phase when these pavements are 9 to 10 years old. The second project consists of a complete rehabilitation when these pavements are reaching an age of 19 to 20 years. Estimated costs for these projects are shown in **Table ES-3**.

TABLE ES-3
LONG-TERM PROJECTS

Project Number	Project Name	Estimated Cost
11	Rehabilitate Runway 17/35	$642,426
12	Widen and Strengthen Taxiway "C"	$4,059,180
13	Overlay Runway 17/35	$4,196,244
	Total	**$8,897,850**

Source: URS Corporation, 2010.

The estimated cost of all 13 projects in the recommended plan is $54,847,705 in 2010 dollars.

PLAN FUNDING

The recommended development plan at SPS would be funded through a variety of sources including grants from the FAA's Airport Improvement Program (AIP), PFCs revenue, airport revenues, and "Other" funding to be identified. With the exception of the proposed terminal complex, the recommended development plan can be reasonably funded from existing funding sources identified in Table ES-4. Funding for the proposed passenger terminal will require additional sources of funds that are as of yet not identified. These funds may ultimately include some private third-party funding.

The total escalated cost of the recommended development plan is $67,853,356. The proposed sources of funds are shown in **Table ES-4**.

TABLE ES-4
SOURCES OF FUNDS

Sources of Funding:	Estimated Amount
AIP Entitlement Grants	$20,281,696
AIP Discretionary Grants	$25,357,774
Passenger Facility Charges	3,879,053
Airport Cash Reserves	3,678,934
Other (To Be Identified) Funding	$14, 655,900
Total Sources of Funding	**$67,853,356**

Source: Leibowitz & Horton AMC, 2010.

Several caveats need to be applied to the AIP discretionary funding amounts indicated in Table ES-4. First, the amount of AIP discretionary funding includes approximately $7.2 million in funding that is likely to be provided by the FAA for the reconstruction of Runway 17/35. Second, an additional $5.2 million in discretionary funding is assumed for the construction of the aircraft parking apron associated with the proposed passenger terminal complex. Third, the remainder of the discretionary funding is assumed for high-priority pavement projects in the intermediate- and long-term, with over $10 million allocated to airfield pavements. While the amount of discretionary funding appears high, it is not unreasonable over a 20-year period considering that $7.2 million is likely to be provided and the remainder includes funds for the construction of the new passenger terminal apron, which is eligible.

Debt financing and City Economic Development funds, despite being considered during the plan's development, are not presently included as funding sources. While these funding sources could be used, City Council has not indicated its support for this method of financing at this time. Consequently, airport management will continue to pursue other potential sources of funding to implement this project.

CONCLUSION

The financial plan relies heavily on FAA AIP funds to implement the proposed CIP. While AIP entitlement funding is a reliable funding source and can be used for reimbursement of eligible project costs, AIP discretionary funding is less certain and has greater restrictions for its use. The amount of AIP discretionary funding assumed in the plan appears reasonable on the basis of past awards and eligibility requirements. Nonetheless, the plan assumes a total of $25 million in AIP discretionary funding over the 20-year planning period. Consequently, if AIP discretionary funding is not available in the amounts and timing required, certain projects may need to be delayed until sufficient funding is available from other sources such as AIP entitlements or passenger facility charges.

Likewise, the financial plan is dependent upon the ability of airport staff to identify one or more additional funding sources in the near term in order to proceed with the implementation of the proposed passenger terminal complex. These additional funding sources may include private third-party funds or some other funding source yet to be identified.

SECTION 1.0

Study Goals and Objectives

1.0 STUDY GOALS AND OBJECTIVES

1.1 INTRODUCTION

This master plan update was commissioned by the City of Wichita Falls for the purpose of providing a comprehensive plan for the future development of Wichita Falls Municipal Airport (SPS) at Sheppard Air Force Base. The plan provides an assessment of existing and forecasted aviation demand and includes a description of the facilities required to meet that demand. The primary focus of the study is to address the location, concept, and feasibility of a new passenger terminal.

A key element of the plan is a series of large scale (30"x42") drawings referred to as the Airport Layout Plan (ALP) Drawing Set (provided separate from this report). These drawings depict existing and future development at SPS for a 20-year planning period extending from 2010 through 2030. This report provides the justification and reasoning for development shown on the plans.

This master plan was financed through a grant by the Federal Aviation Administration (FAA) and passenger facility charges (PFCs) collected on each ticket of passengers using SPS. The master plan update report consists of the following elements:

- **Inventory** – Existing facilities and operational conditions are documented.
- **Forecasts** – Projected growth rates for passengers and aircraft operations are established.
- **Facility Requirements/Terminal Programming** – Comparisons are made between the capacity of existing facilities and projected levels of demand for those facilities. New or expanded facilities are recommended to address any shortfalls of capacity.
- **Terminal Concept Development and Evaluation** – Various options for the construction of new passenger terminal facilities are explored and evaluated. This section also addresses options for other airport facilities including access, parking, general aviation, and support facilities.
- **Refinement of Preferred Terminal Concept** – The preferred terminal concept is taken to a greater level of detail and detailed in a series of plan and cross-section views, as well as renderings.
- **Airport Plans** – A consolidated plan for airfield, terminal area, and general aviation facilities is prepared on the basis of the recommended concept.
- **Facilities Implementation Plan** – A facilities implementation plan consisting of project identification, project cost estimates, and project phasing is developed. Once these tasks are completed, a consolidated capital improvement plan is produced.
- **Financial Plan** – A financial plan that identifies sources and uses of funding is prepared along with an analysis of the economic feasibility of the plan.

1.2 STUDY GOALS AND OBJECTIVES

Several goals were prepared to ensure that this master plan update reflects the needs of the City of Wichita Falls, passengers and tenants, as well as residents and businesses of the Airport's service area. These goals served as guidelines during the preparation of the master plan and were supplemented through input from various stakeholders during the course of the study.

1.2.1 GENERAL GOALS

- The plan shall provide for the air transportation needs of the City of Wichita Falls and the entire airport service area.
- The plan shall propose development in a manner that optimizes income potential and remains financially sound.
- The plan shall propose development that is environmentally acceptable in accordance with city, county, regional, state, and Federal guidelines.
- The plan shall identify locations in the terminal area that are suitable for passenger terminal development.
- The plan shall address the needs of all types of airport users including scheduled and charter passenger airlines, cargo operators, and general aviation.

1.2.2 SPECIFIC GOALS AND OBJECTIVES FOR TERMINAL DEVELOPMENT

A series of specific goals and objectives were developed to address the issue of passenger terminal development. These goals and objectives are described below.

Goal: Provide Passengers with a Superior Level-of-Service

Objectives:

1. Minimize walking distances from automobile parking to terminal and from terminal curb to the aircraft.
2. Provide canopy cover for exterior portions of the building that are used by passengers and airline employees (i.e., from the terminal curb to the building and over inbound and outbound baggage).
3. Provide adequate seating areas for departing passengers in a secure departure holdroom, as well as meeters/greeters in non-secure areas.
4. Minimize passenger congestion by reducing crossing passenger flows and providing adequate space for queues.
5. Maximize passenger orientation by minimizing changes in passenger flow and direction.
6. Provide wide and numerous points of ingress/egress to minimize passenger walking distances and allow for unimpeded flow of passengers carrying baggage.

7. Provide convenient facilities for baggage check-in located a minimum walking distance from automobile parking and passenger drop-off.

8. Provide for public displays and kiosks that contain visitor information and highlight local attractions.

Goal: Provide Adequate Airline Facilities

Objectives:

1. Provide conveniently located and contiguous airline ticket counters that incorporate the use of electronic ticketing machines.

2. Provide adequate space for passenger queuing.

3. Provide adequate and conveniently located office space for administrative functions.

4. Provide sufficient space for baggage make-up, freight and storage of airline equipment, and supplies.

5. Provide for conveyor movement of outbound baggage from ticket counter to security screening and to outbound baggage make-up.

Goal: Provide Adequate Baggage Claim

Objectives:

1. Allow sufficient carousel length to efficiently accommodate baggage claim during peak periods.

2. Provide an adequate baggage claim lobby that minimizes passenger congestion.

3. Locate baggage claim adjacent to ground transportation services and facilities.

Goal: Americans with Disabilities Act (ADA) Compliance

Objectives:

1. Ensure that all passengers and employees have an unimpeded path to public-access areas of the terminal.

2. Provide barrier-free access to all restrooms.

3. Provide amenities at accessible heights and locations.

Goal: Maximize Flexibility and Expandability

Objectives:

1. Plan facilities to efficiently accommodate peak hour passenger loads, including charter and scheduled airline service.

2. Locate facilities in a manner that allows for future expansions without major relocations of existing facilities.

3. Minimize impacts upon existing terminal operations during construction.

Goal: Provide Safety and Security

Objectives:

1. Provide adequate space for explosive detection technology of outbound baggage.

2. Provide sufficient space for passenger security screening, including passenger queues leading to checkpoints, as well as tables for removal and collection of personal effects during pre-screening and post-screening.

3. Provide proper access control systems to exclude unauthorized entry to secure areas.

4. Provide for closed circuit television (CCTV) monitoring of terminal facilities.

5. Provide properly located administrative and operations space for Transportation Security Administration (TSA) and law enforcement officers.

Goal: Maximize Concessions/Income Potential

Objectives:

1. Provide sufficient space for concessions that will provide revenue to the Airport and serve passenger needs.

2. Position security screening past concession areas to maximize customer access and revenue generation.

3. Position concessions in highly visible areas that experience the highest pedestrian flows.

Goal: Provide Convenient Roadway Access

Objectives:

1. Provide roadway access to the front of the terminal that will minimize passenger walking distances.

2. Provide convenient return access to parking after passenger drop-off at the terminal curb.

SECTION 2.0
Existing Conditions

2.0 EXISTING CONDITIONS

The data presented in this section was obtained through a variety of sources including on-site interviews and field inspections, as well as reviews of previous documents and studies. Data was also obtained from secondary sources at the Federal, state, and local level. The following subsections address general information, airport facilities, local airspace, meteorology, surrounding land use, and utilities. Information presented in this section serves as a resource for analyses contained in subsequent sections.

2.1 INTRODUCTION

Wichita Falls Municipal Airport (SPS) is located in the North-Central part of Texas, approximately 4 miles north of the Central Business District of the City of Wichita Falls, Texas. **Figure 2-1** illustrates its location in the State of Texas and its location relative to the City of Wichita Falls.

SPS is located at Sheppard Air Force Base which is a joint-use airfield. The joint-use designation means that in addition to serving as an active U.S. Air Force Base, it also allows civilian aviation to use a portion of its property. Specifically, the U.S. Air Force leases approximately 79 acres of Sheppard Air Force Base to the City of Wichita Falls for use as a municipal airport (see **Figure 2-2**). This lease enables the City to provide public facilities for scheduled and non-scheduled commercial passenger service and general aviation operations. The lease was renewed in 2009 and now extends through 2059. The lease includes the passenger terminal area, Taxiway C, and Runway 17/35. The lease boundary extends only to the pavement edge for Taxiway C and Runway 17/35. It does not include any adjoining infield areas.

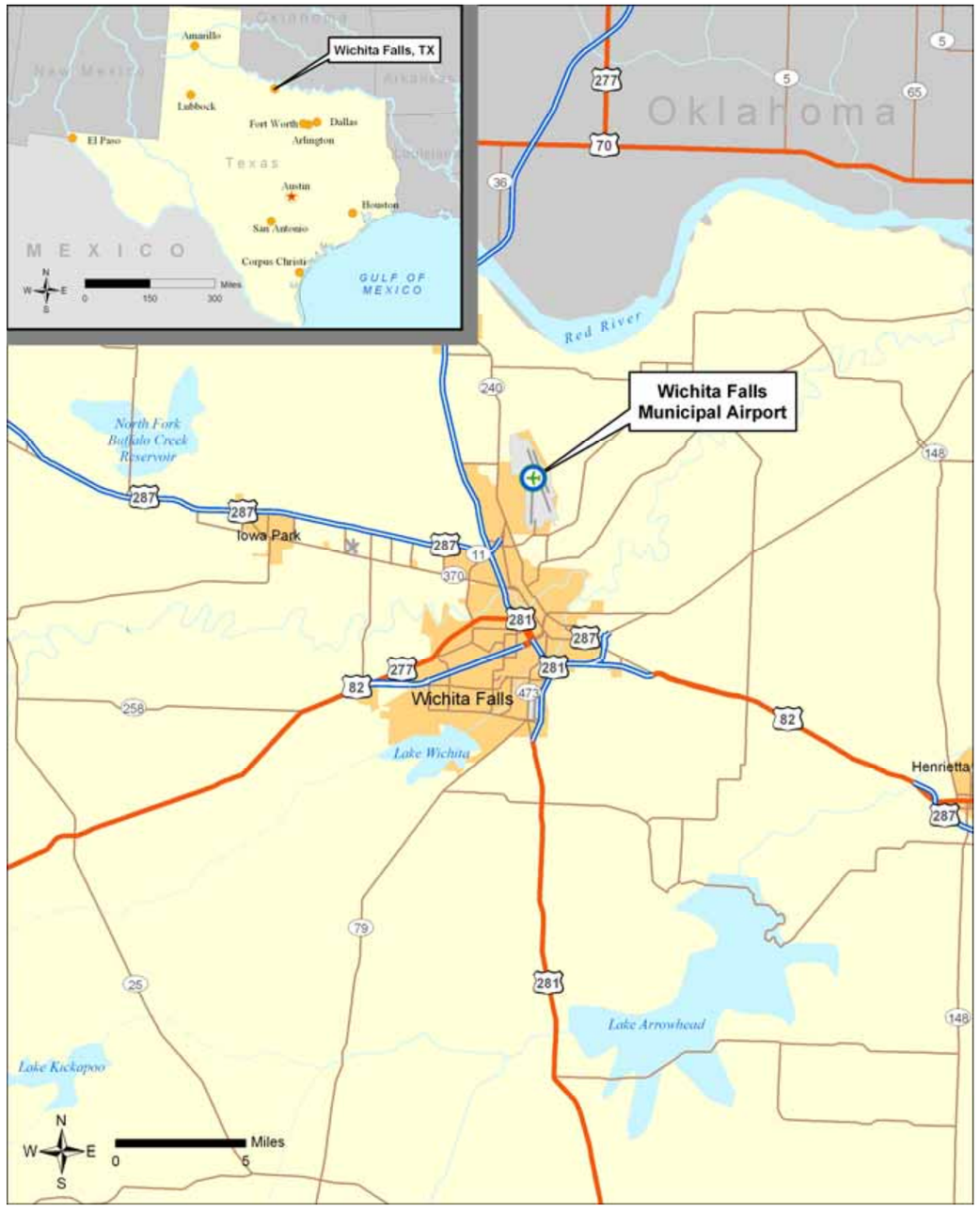
2.2 AIRPORT HISTORY

The birth of aviation in Wichita Falls began with the establishment of a World War I training base, Call Field in 1917. Call Field was active through November 1918 and was a training location for some of the country's first military aviators. The closure of Call Field, however, did not diminish the awareness of the local businessmen of the growing importance of aviation activities for the community.

The birth of commercial aviation in Wichita Falls occurred around 1928 with the establishment of the Wichita Falls Air Transport Company by Fulcher Armstrong and the opening of Kell Field by a group of local businessmen. Aviation activities continued to grow in Wichita Falls through the late 1930's when the US Government began to recognize the need for additional military training locations across the country and identified an area in Wichita Falls adjacent to Kell Field as having potential. Senator and Chairman of the Senate Committee on Military Affairs, Morris Sheppard, was particularly supportive of the Wichita Falls community and its efforts to secure the training base. Encompassing 604 acres, Sheppard Field was officially dedicated on October 17, 1941, named for the late Senator.

With the end of World War II, Sheppard Field was inactivated on August 31, 1946 with control of the land and buildings retained by the City. The City was permitted continued use of some of the installation's facilities for its Municipal Airport. But it was not long before the installation was reactiviated as Sheppard

FIGURE 2-1
AIRPORT LOCATION MAP



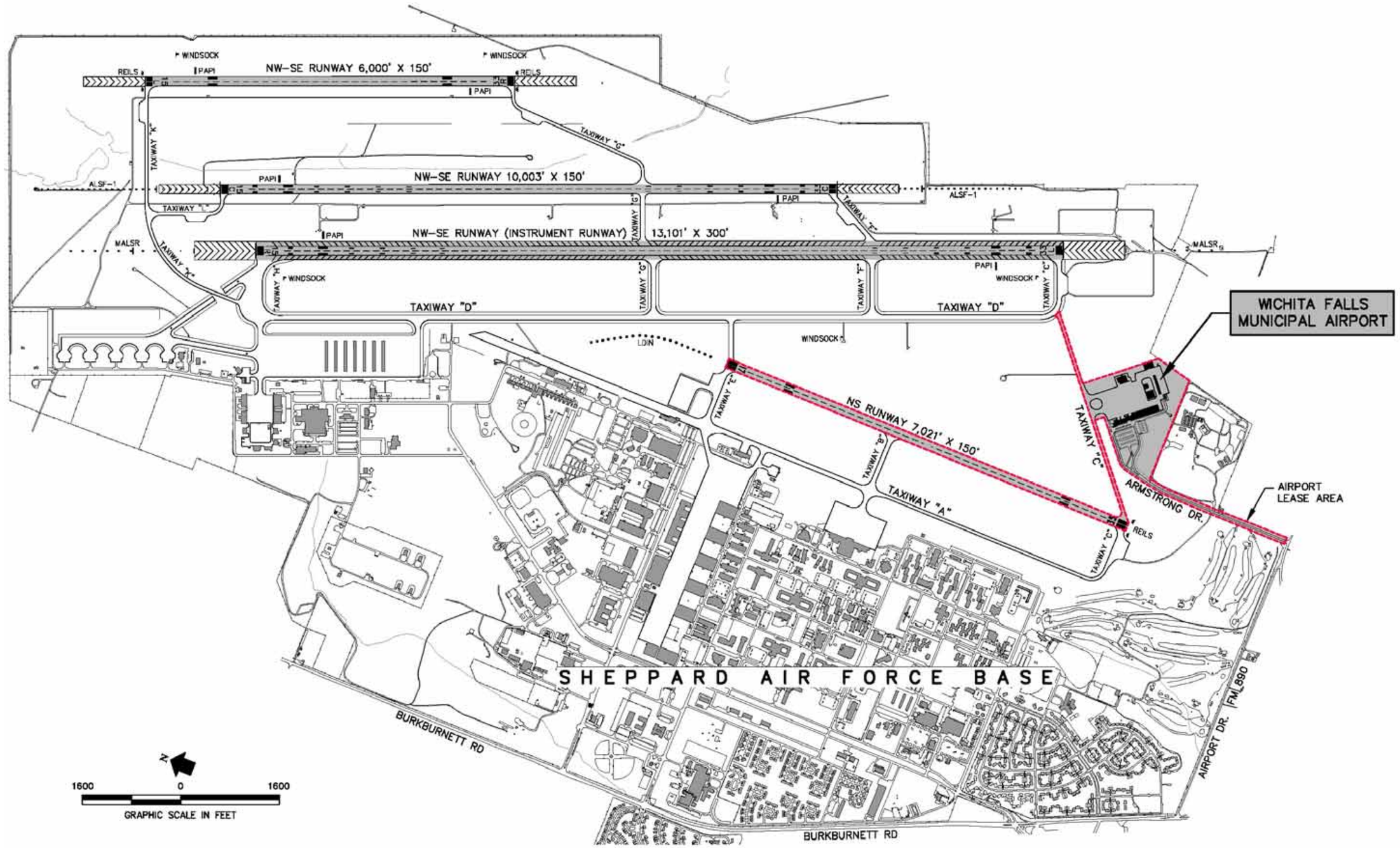


FIGURE 2-2
EXISTING AIRFIELD FACILITIES

Air Force Base on August 15, 1948. Eventually Kell Field was incorporated into the base property and the need for segregation of civilian aviation activities was identified.

Finally, in 1959 new 50 year lease and joint use agreements were executed between the City and the Department of the Air Force for the property on which the Wichita Falls Municipal Airport sits today. In 2009, another set of 50 year lease and joint use agreements for the Municipal Airport property were executed. These agreements represent the cooperation between the City and US Air Force since 1941 to provide for mutually beneficial air service and airport facilities in our community.

2.3 AIRPORT FACILITIES INVENTORY

Descriptions of existing airport facilities (as of July 2009) are presented in the following paragraphs. Airfield facilities are described first, followed by landside facilities.

2.3.1 AIRFIELD FACILITIES

2.3.1.1 Runways

The airfield at SPS consists of four runways, as shown in Figure 2-2. Three runways are situated in a parallel configuration. These runways are designated 15R/33L, 15C/33C, and 15L/33R. There is also one runway in a crosswind configuration with the designation 17/35. The runway designations refer to each runway's magnetic heading. For example, Runway 17 has a magnetic heading close to 170 degrees, while Runway 35 has a magnetic heading close to 350 degrees. **Table 2-1** presents relevant information regarding these runways.

TABLE 2-1
RUNWAY DATA

Runway	Length	Width	Pavement	Lighting	Approach Lighting
15R/33L	13,101'	300'	Concrete	HIRL	MALSR
15C/33C	10,003'	150'	Asphalt-Concrete	HIRL	ALSF-1
15L/33R	6,000'	150'	Asphalt-Concrete	HIRL	None
17/35	7,021'	150'	Asphalt	HIRL	LDIN (RWY 17)

Source: Federal Aviation Administration (FAA), Airport Facility Directory, South Central US, July 2009.
Notes: HIRL=High Intensity Runway Lighting, MALSR=Medium Intensity Approach Light System with Runway Alignment Indicator Lights, ALSF-1=Approach Light System with Sequenced Flashing Lights, LDIN=Lead-in Light System.

Runway 17/35 is included in the City's lease and is designated for civilian use by commercial air carriers and general aviation operations. Civilian aircraft operations on the three parallel runways are limited to periods when operationally necessary for safety or operational requirements. Several precision and non-precision instrument approaches are published for the Runway 15/33 system. This includes Instrument Landing System (ILS) approaches to Runways 15C and 33L. Only visual approaches are conducted to Runway 17/35. The Lead-in Lighting System (LDIN) on the approach to Runway 17 consists of a series of flashing lightings on the ground. The purpose of this lighting system is to provide visual guidance to pilots and assist them in remaining clear of operations on the Runway 15/33 system.

Table 2-2 presents the pavement strengths for the four runways at SPS.

TABLE 2-2
RUNWAY PAVEMENT STRENGTHS

Wheel Configuration	Runway 15R/33L	Runway 15C/33C	Runway 15L/33R	Runway 17/35
Single-Wheel	60,000 lbs.	60,000 lbs.	20,000 lbs.	20,000 lbs.
Single-Wheel Tandem (C130)	175,000 lbs.	175,000 lbs.	N/A	N/A
Dual-Wheel	200,000 lbs.	160,000 lbs.	45,000 lbs.	45,000 lbs.
Dual-Wheel Tandem	345,000 lbs.	250,000 lbs.	80,000 lbs.	80,000 lbs.
Double Dual Tandem	840,000 lbs.	N/A	N/A	N/A

Source: FAA, Airport Facility Directory, South Central US, July 2009.
Notes: N/A=Not applicable or available.

2.3.1.2 Taxiways

The taxiway system at SPS consists of full length parallel taxiways on the west side of Runway 15R/33L (Taxiway D) and Runway 17/35 (Taxiway A), as well as a series of connecting taxiways that provide access to the municipal airport and apron areas of Sheppard Air Force Base. Taxiway C provides access from Runway 17/35 and Taxiway D to the passenger terminal area. This taxiway was rehabilitated in 2007 through a combination of panel replacement, joint sealing, and spall repair. The taxiway pavement is presently in excellent condition. Taxiway C has a width of 50 feet which is adequate for aircraft in Design Group III, but not aircraft with wheel bases greater than 60 feet, such as the Boeing MD-80 (62 feet). In addition, the pavement strength of Taxiway C is insufficient to accommodate air carrier aircraft such as the Boeing B-737 or the Boeing MD-80.

Taxiway A is presently closed south of Taxiway B due to poor pavement condition. Consequently, aircraft departing on Runway 17 must taxi along Taxiways C, D, and E to depart from that end of the runway.

2.3.1.3 Apron

The aircraft parking apron is accessed from Taxiway C and consists of approximately 53,000 square yards (11 acres). Of this area, less than half is available for aircraft parking. The remainder is used for taxiing of aircraft to and from Taxiway C and other general aviation facilities and hangars.

The north portion of the aircraft parking apron was rehabilitated in 2007 along with the rehabilitation of Taxiway C and is in good condition. The south portion of the apron is in poor condition. In addition to pavement cracking and spalling, there are problems associated with seepage at pavement joints. Apron pavement strength is sufficient to accommodate the movement and parking of commuter aircraft such as regional jets and turboprops, but is insufficient to accommodate use by air carrier aircraft.

The apron accommodates all aircraft parking at the passenger terminal including regional jets and air carrier charters such as B-737 and MD-80 aircraft. On certain occasions when Dallas/Fort Worth International Airport experience inclement weather, the apron accommodates multiple air carrier aircraft that are temporarily diverted to SPS.

2.3.2 TERMINAL AREA FACILITIES

The passenger terminal area at SPS consists of the passenger terminal, a Fixed Base Operator (FBO) and a variety of hangars, a fuel farm, and automobile parking areas. **Figure 2-3** provides an illustration of the terminal area facilities described on the following pages.

2.3.2.1 Passenger Terminal

The passenger terminal is a one-story structure originally constructed in 1959. Various additions and remodeling of the terminal occurred in 1968, 1973, 1979, 1983, 1986, and 2006.

A restaurant and kitchen area (which is now used for Transportation Security Administration (TSA) offices and passenger security screening), as well as the enclosure walkways to the aircraft, were added to the terminal in 1968. The addition in 1973 included the construction of the airport administration offices and the large storage area on the east side of the terminal. The baggage claim area was added in 1979. General remodellings were completed in 1983 and 1986. The departure holdroom was renovated in 2006. The terminal provides approximately 17,500 square feet of interior space.

Figure 2-4 provides an illustration of the passenger terminal interior and the use of each space. **Table 2-3** provides an estimate of the amount of space devoted to each type of use inside the terminal. These estimates are based upon Figure 2-4 which was created using historical architectural and design plans for the terminal.

Portions of the terminal range from fair to poor condition. Problems currently include numerous roof leaks, inefficient heating and air conditioning, ingress/egress problems associated with doors that no longer function properly, and an overall inefficient passenger flow resulting from the various additions that have occurred and the resulting movement of functions within the existing space. In addition to problems associated with the age and condition of terminal facilities, there are functional issues that were identified through site inspections and discussions with airport management. These issues are described in the following paragraphs.

Security Screening

The amount of space available for security checkpoint screening is insufficient. Lack of space for tables leading to and from the magnetometer is problematic because it does not enable multiple passengers to place their personal items into screening bins simultaneously for screening. This leads to delays as passengers place their personal effects into screening bins sequentially. The same problem occurs at the other side of the checkpoint as passengers reclaim their personal items. In addition, there is insufficient space for secondary screening and private screening.

Departure Holdroom

The departure holdroom is approximately 780 square feet and does not allow for more than one commuter flight to be held in a secure space at one time. Furthermore, there are no restrooms inside the departure holdroom. Consequently, any passenger that leaves the holdroom to use restroom facilities would have to be re-screened. For this reason, the TSA does not begin screening most departing flights until close to departure time, which results in departing passengers being held outside the departure holdroom in the lobby/public seating area. While the departure holdroom is adequately sized to accommodate passengers for one commuter aircraft at a time, it is not adequately sized to accommodate multiple flights or even one charter flight with an air carrier aircraft (i.e., B-737, MD-80).

TABLE 2-3
EXISTING PASSENGER TERMINAL - ESTIMATED SPACE BY USE

Terminal Use	Space (SF)	Percent of Floor Space
Airline Space		
Airline Ticket Office	1,647	30%
Airline Ticket Counter	367	
Airline Ticket Queuing	260	
Outbound Baggage	1,060	
Departure Holdroom	779	
Baggage Claim	1,198	
Subtotal	5,311	
Public Space		
General Circulation	2,987	35%
Lobby - Public Seating	1,279	
Security Screening	885	
Restrooms	880	
Subtotal	6,031	
Concessions		
Game Room/Vending	678	9%
Rental Cars	364	
Janitorial/Utilities	554	
Subtotal	1,596	
Other		
Storage	2,265	26%
Airport Administration	893	
TSA Office Space	1,243	
Law Enforcement	148	
Subtotal	4,549	
Total	**17,487**	**100%**

Source: Space estimates compiled by URS Corporation, 2009.

Ingress/Egress

Airline personnel estimate that approximately 60 percent of passengers at SPS are military personnel. These passengers typically have multiple large duffle bags to check at the ticket counter. The existing terminal doors are too narrow to easily accommodate the ingress and egress of these passengers along with their baggage. Consequently, operational problems with the existing door systems are commonly encountered. In addition, the terminal doors near the ticket counter are commonly opened by the movement of passenger queues inside the terminal. This results in excessive loss of air conditioning/heating.

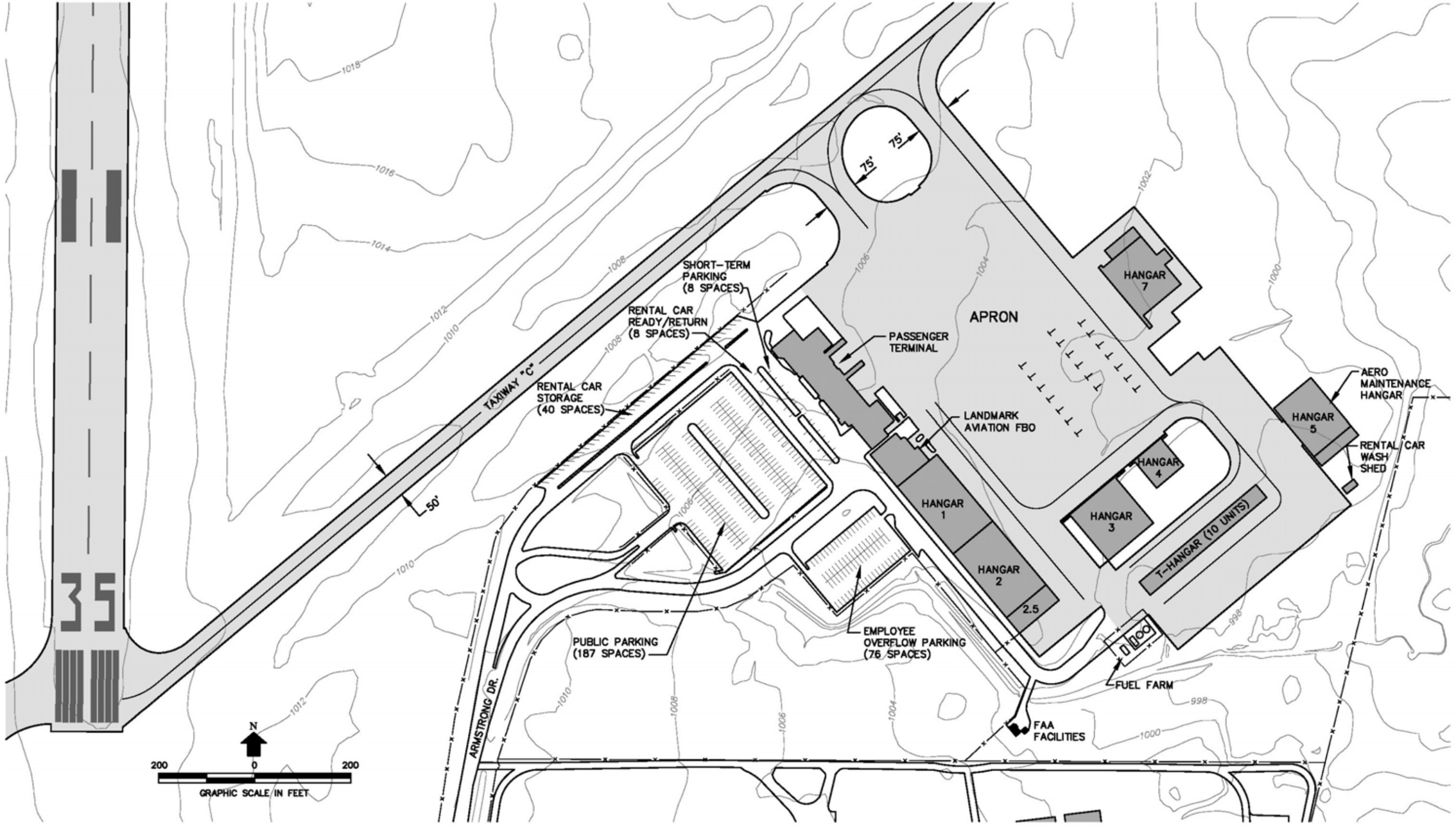


FIGURE 2-3
EXISTING TERMINAL AREA FACILITIES

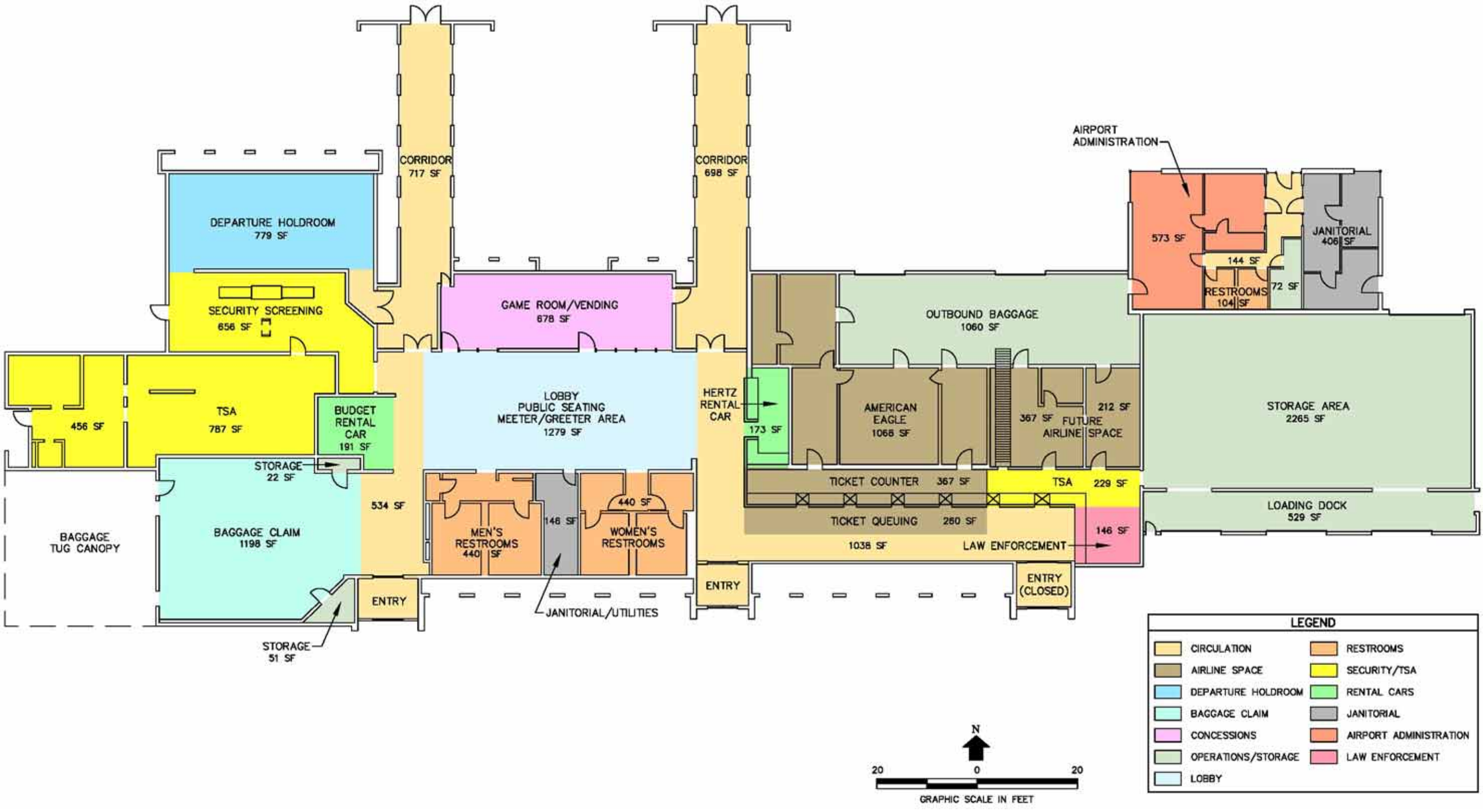


FIGURE 2-4
EXISTING PASSENGER TERMINAL

Ticket Counter Lobby

Passenger queues from ticketing often extend out of the ticket lobby past the terminal entrance/exits. These queues sometimes block passengers entering or exiting the terminal or accessing the Hertz counter.

Restrooms

As noted, there are no restrooms beyond security screening. In addition, the existing restrooms do not provide barrier free access for disabled persons. Planned renovations of TSA space within the next 18 months may also include restroom improvements.

2.3.2.2 FBO Facilities

Landmark Aviation is the Airport's only FBO. The FBO building is located east of, and adjacent to, the passenger terminal. It contains office space, a pilot's lounge, restrooms, and a flight planning room. The FBO has three adjacent hangars (Hangar 1, Hangar 2, and Hangar 2.5) that are used for aircraft storage. Two additional hangars, Hangar 3 and Hangar 4 are located in the middle of the aircraft parking apron and are primarily used for storage of itinerant aircraft. The FBO also manages one row of T-hangars containing 10 units. Discussions with FBO management and airport management revealed that apron drainage issues cause flooding in certain T-hangars units. All FBO buildings and hangars are owned by the City of Wichita Falls. Table 2-4 provides information on the FBO facilities and hangars.

TABLE 2-4
FBO FACILITIES AND HANGARS

Item	Size (SF)	Construction	Year Built
FBO Offices	6,622	Block	1959
Hangar 1	19,400	Metal	1959
Hangar 2	18,500	Metal	1959
Hangar 2.5	4,500	Metal	1959
Hangar 3	15,300	Metal	1959
Hangar 4	4,900	Metal	1987
T-Hangars	11,000	Metal	1977

Source: URS Corporation, 2009. Hangar sizes based upon takeoff quantities from aerial photographs.

Hangar 5

Hangar 5 is a privately-owned, open-bay facility built in 1999. It contains the operations of Aero Maintenance, Inc., a provider of aircraft maintenance services. The hangar has a width of 132 feet and a depth of 98 feet. Office space inside the hangar consumes 16 feet along the southeast side of the hangar. The hangar is metal construction and is in excellent condition. Automobile parking is provided beneath a carport that is attached to the southeast side of the hangar.

Hangar 7

Hangar 7 is a privately-owned, open-bay facility built in 2003. The hangar is used for aircraft storage and is in excellent condition.

2.3.2.3 Fuel Farm

The fuel farm at SPS was originally constructed in the 1950's and presently consists of two 18,500-gallon tanks that contain Jet-A and one 10,000-gallon tank that contains AVGAS. The fuel farm also contains a 500-gallon tank for diesel fuel which is used by airport vehicles. All the fuel tanks are located above ground.

The last major improvement to the fuel farm was made in 1998 when spill containment walls were installed. The fuel farm is owned by the City of Wichita Falls and operated by Landmark Aviation.

2.3.3 AIRPORT ACCESS AND PARKING

Access to SPS is provided by Airport Drive (Farm-to-Market 890) a two-lane undivided road. There is a dedicated turn lane from eastbound Airport Drive into the Airport. Access on airport property is provided by Armstrong Drive which is also a two-lane undivided road. This road also provides access to non-airport property and terminal area facilities.

Parking in the terminal area is provided in three primary lots. The public parking lot provides approximately 187 parking spaces. An overflow/employee parking lot provides an additional 76 parking spaces. A total of 40 spaces in the overflow lot are leased to rental car companies. Airport employees also park in this lot. Access to both the public parking lot and the overflow/employee lot is controlled via gates. The parking rate is presently a flat $3 dollars per visit in both lots. Payment is made via automated currency collectors at the parking lot exits. These collectors also control automated exit gates.

A third parking lot provides 40 spaces dedicated to rental car storage. This lot is located along the portion of Armstrong Drive exiting from the passenger terminal along the airfield fence line. Access to this lot is uncontrolled. However, large signs mark each space number for the associated rental car company. Unauthorized use of this parking area has not been a problem according to airport management.

Short-term parking via parking meters is provided along a parking island directly across from the terminal curb. Eight spaces are provided for this purpose. An additional 8 parking spaces are provided on the far side of a parking island, which are leased to Hertz and Budget for use as ready/return spaces for rental cars. Each space is marked with the rental car company's designation.

2.4 AIRSPACE AND AIR TRAFFIC CONTROL

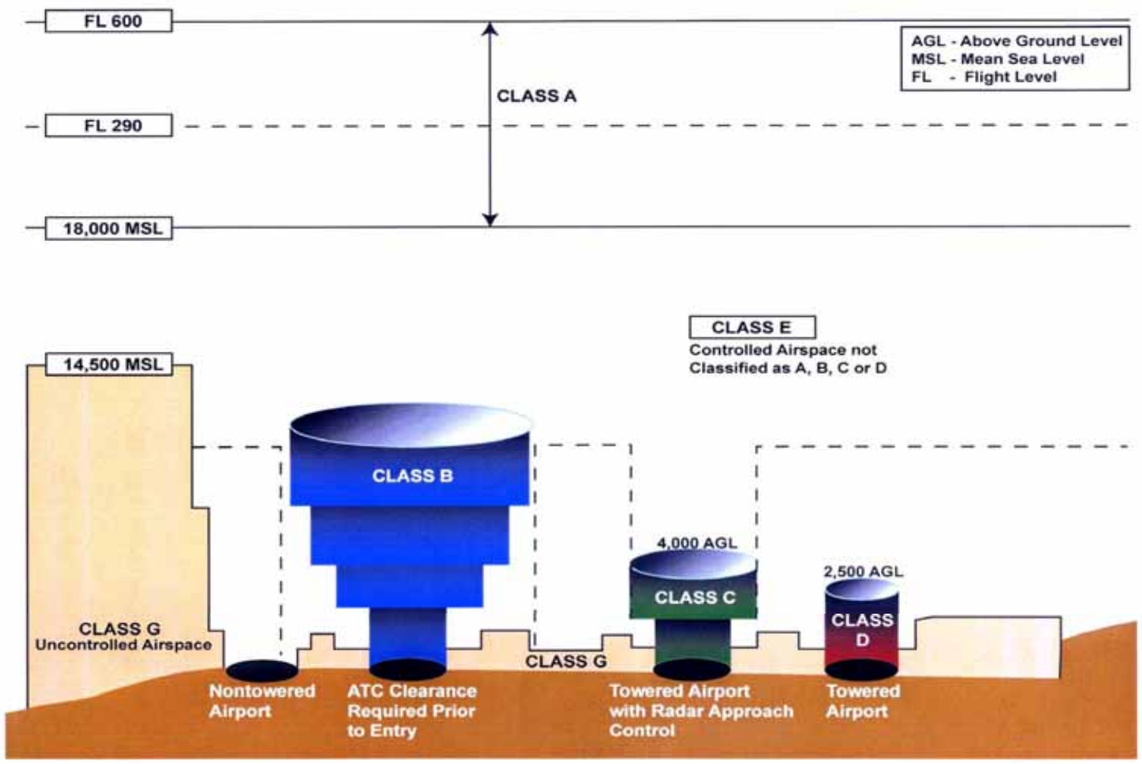
2.4.1 AIRSPACE

Airspace in the United States is classified into the following categories: controlled, uncontrolled, special use, and other. A brief description of these categories and how they apply to airspace in the vicinity of SPS is provided in the following subsections.

2.4.1.1 Controlled Airspace

Controlled airspace is classified as Class A, B, C, D, and E. These airspace classes have different dimensions, purposes, and requirements. A generic view of the classes and their relationship to each other is provided in **Figure 2-5.**

FIGURE 2-5
AIRSPACE CLASSES



Class A airspace covers the United States and encompasses all airspace from 18,000 feet mean sea level (MSL) to 60,000 feet MSL. Aircraft flying in Class A airspace must operate under instrument flying rules.

There is no Class B or Class C airspace in the vicinity of SPS. However, the Airport is located in the center of an area defined as Class D airspace. Aircraft operating in Class D airspace must maintain radio contact with the appropriate control facility while operating in the airspace. Pilots must also abide by certain operating, pilot, and equipment rules while operating within Class D airspace. The Class D airspace surrounding SPS extends outward 5 nautical miles (NM) and extends upward to an altitude of 3,500 feet.

Class E airspace includes all the airspace that is not classified as A, B, C, or D. Class E airspace has no special restrictions with respect to pilot or aircraft equipment rules. However, it is controlled airspace, meaning that aircraft can be provided with air traffic control services. Class E airspace with a floor of 700 feet above ground level (AGL) is in effect for the SPS area when the air traffic control tower is not in operation.

Figure 2-6 depicts the airspace surrounding the Airport. This information was obtained from the Dallas/Fort Worth Sectional Aeronautical Chart, published by the FAA's National Aeronautical Charting Office.

FIGURE 2-6
LOCAL AIRSPACE

2.4.1.2 Uncontrolled Airspace

Class G airspace is uncontrolled airspace. It consists of all airspace that is not classified as A, B, C, D, or E. Pilots flying in Class G airspace have the responsibility to see and avoid other aircraft. No air traffic control services are available in this airspace.

2.4.1.3 Special Use Airspace

According to the Airman's Information Manual, Special Use Airspace consists of that airspace wherein activities must be confined because of their nature, or wherein limitations are imposed upon aircraft operations that are not a part of those activities, or both. Special Use Airspace consists of Prohibited and Restricted Areas, Warning Areas, Military Operation Areas (MOAs), Alert Areas, and Controlled Firing Areas.

There are no prohibited or restricted areas or controlled firing ranges in the vicinity of SPS. The nearest restricted airspace is located northwest of Lawton, Oklahoma. Likewise there are no warning areas near SPS.

There are large MOAs located east, north, and west of SPS. The Sheppard 1 MOA is located approximately 15 miles north of SPS. The Sheppard 2 MOA is located approximately 9 miles east of SPS. The Westover 1 MOA is located approximately 25 miles west of SPS. The Sheppard MOAs extend from a base elevation of 8,000 feet up to an altitude of 18,000 feet. The Westover MOA extends from 9,000 feet up to 18,000 feet. Victor airways that extend northeast toward Oklahoma City and west toward Amarillo provide corridors for civilian traffic to transit outside of these three large MOAs.

All airspace extending from the surface up to an elevation of 4,000 feet for a distance of approximately 13 miles from SPS is designated an Alert Area. This Alert Area is to alert pilots that high density student training occurs within this airspace.

2.4.2 AIR TRAFFIC CONTROL

Air traffic control at SPS is provided by the US Air Force approach control, departure control, and the air traffic control tower. The air traffic control tower is operational from 5:30am to 9:00pm Monday through Friday, noon to 5:00pm on Sunday, but is closed on Saturdays and holidays. Consequently, aircraft operation counts maintained by control tower personnel do not account for all aircraft operations that occur at the Airport.

2.5 METEOROLOGICAL DATA

Weather conditions play an important role in determining an airport's capacity and facility requirements. Items of interest are temperature and precipitation, ceiling and visibility, as well as local wind conditions. Temperature and precipitation information is used to determine runway length requirements, while ceiling, and visibility data is used to determine the capacity of the existing airfield. Wind data is used to determine the adequacy of the existing runway orientation, as well as the number of runways.

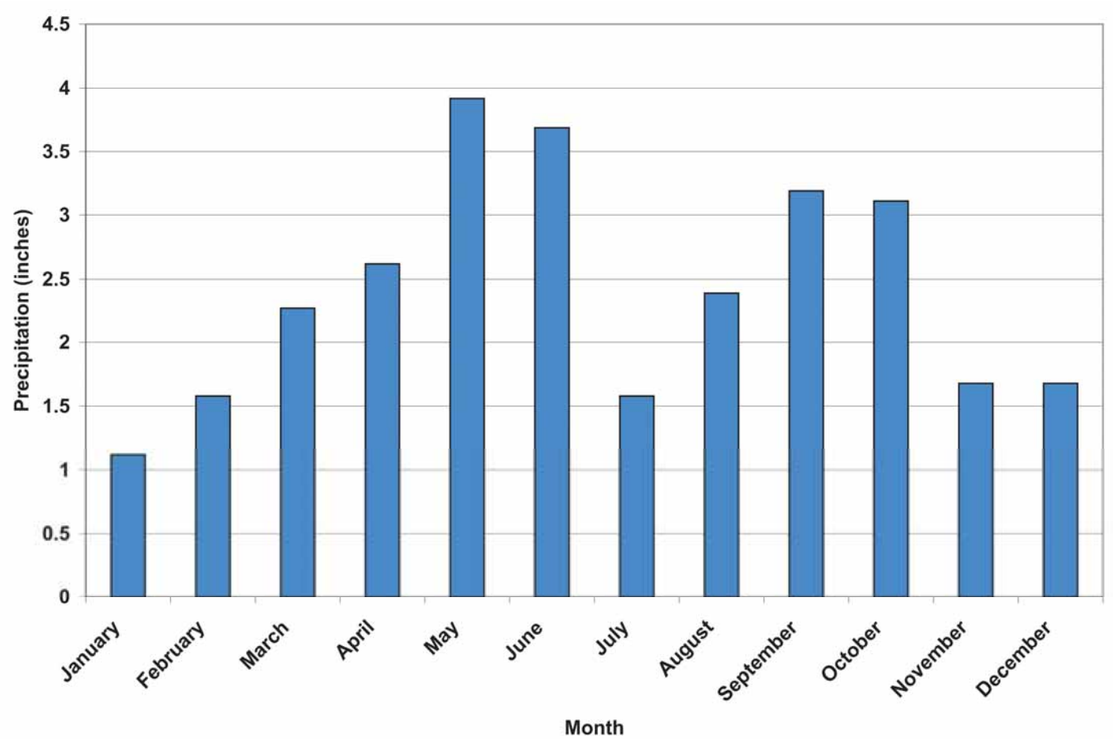
Temperature and precipitation conditions at SPS were analyzed using data from the National Oceanic and Atmospheric Administration's (NOAA'a) "Climatography of the United States Report No. 81 for the State of Texas," which encompasses the period from 1971 to 2000. Wind and ceiling/visibility conditions at SPS were analyzed using hourly observations collected by the National Climatic Data Center for the period from January 1999 through December 2008.

2.5.1 TEMPERATURE AND PRECIPITATION

The normal mean maximum temperatures at SPS range from a low of 52.1 degrees Fahrenheit (F) in January to 97.2° F in July, the hottest month of the year. On an annual basis, the normal mean maximum temperature averages 75.3° F. In comparison, the normal mean minimum temperature ranges from 28.9° F to 72.4° F for the months of January and July, respectively. The annual average normal mean minimum temperature is 63.1° F.

Precipitation varies throughout the year at SPS. January is the driest month with a mean rainfall of 1.12 inches, while May is the wettest month with a mean rainfall of 3.92 inches. The mean annual precipitation at SPS is 28.8 inches. **Figure 2-7** depicts the average monthly rainfall at SPS for 1971 through 2000.

FIGURE 2-7
AVERAGE MONTHLY RAINFALL



2.5.2 CEILING AND VISIBILITY

The FAA has defined certain limits of ceiling height and visibility limits as visual meteorological conditions (VMC) and instrument meteorological conditions (IMC). These limits affect flight operations by establishing certain rules and procedures for pilots, aircraft, and air traffic control. During VMC pilots must adhere to visual flight rules (VFR). During IMC pilots must adhere to instrument flight rules (IFR). VFR and IFR weather conditions are defined as follows:

- VFR weather conditions are defined as periods when the cloud ceiling is greater than 1,000 feet AGL and the horizontal visibility is greater than 3 statute miles.
- IFR weather conditions are defined as periods when the cloud ceiling and is less than 1,000 feet and horizontal visibility is less than 3 statute miles.

Weather data obtained from the National Climatic Data Center for SPS covered the 10-year period from 1999 through 2008 and included 82,803 weather observations. This data was analyzed for cloud ceiling/horizontal visibility conditions and wind direction and velocity. The analysis of ceiling/visibility data revealed that VFR weather conditions prevail at SPS approximately 95.9 percent of the time. IFR conditions prevail approximately 4.1 percent of the time.

2.5.3 WIND ANALYSIS

Winds in the vicinity of SPS are predominately from the south-southeast. **Figure 2-8** and **Figure 2-9** illustrate the percentage of annual wind direction observations during all-weather and IFR conditions. On an annual basis, winds are primarily from the south-southeast. During IFR conditions, winds are predominantly from the north and northeast.

Monthly wind conditions at SPS are depicted in **Figure 2-10**. The monthly analysis reveals that seasonal variations occur. The prevailing winds during the spring and summer months are consistently from the south-southeast, while the prevailing winds during late fall and winter months are more evenly distributed between the south-southeast and the north-northwest. The wind distribution during fall and winter months reflects the occurrence of cold fronts moving through the area.

An analysis of the wind coverage provided by the existing runway system with all-weather conditions is provided in **Table 2-5**. Wind coverage indicates the percentage of time that crosswind components are within an acceptable velocity. For the purpose of runway wind analyses, a crosswind component can be defined as the wind that occurs at a right angle to the runway centerline. Crosswind components of 10.5, 13, 16, and 20 knots were used for analyzing the runway system at SPS. These components were used because they are the velocities specified for runway having reference codes up to D-III (the issue of airport reference codes is discussed in Section 4.0 - Facility Requirements, to be provided).

FAA guidelines recommend that an airport's runway system provide wind coverage of 95 percent. If wind coverage is less than 95 percent, FAA guidelines recommend that the construction of additional runways be considered. Table 2-5 indicates that the existing runway system at SPS provides wind coverage greater than 95 percent even with a 10.5 knot crosswind component and, therefore meets FAA criteria for wind coverage.

TABLE 2-5
RUNWAY WIND COVERAGE (ALL-WEATHER CONDITIONS)

Runway	Crosswind Component			
	10.5 Knots	13 Knots	16 Knots	20 Knots
15/33	90.38	95.34	98.58	99.62
17/35	92.09	96.12	98.76	99.64
Both Runways	95.36	97.86	99.34	99.8

Source: NOAA, National Climatic Data Center, Weather Station 72351, Wichita Falls, Texas, wind data for 1999 through 2008. Compiled by URS Corporation, 2009.

2.6 SURROUNDING LAND USE

Land use surrounding SPS was identified through a review of aerial photography and the City of Wichita Falls Land Use Map shown in **Figure 2-11**. As the figure indicates, the city limits for the City of Wichita Falls extend to the west and south of SPS, but do not encompass areas east or north of the Airport that are located in Wichita Falls County. A description of land use surrounding the Airport is provided in the following paragraphs.

2.6.1 NORTH

Land use north of SPS is a mixture of residential and agricultural uses. Residential areas are located east of Burkburnett Road in the vicinity of Cushion Road and Cashion Road. Farther to the northwest is the City of Burkburnett.

2.6.2 EAST

Land use east of the Airport toward the Wichita River is primarily agricultural. Small amounts of rural residential land use occur along primary roads.

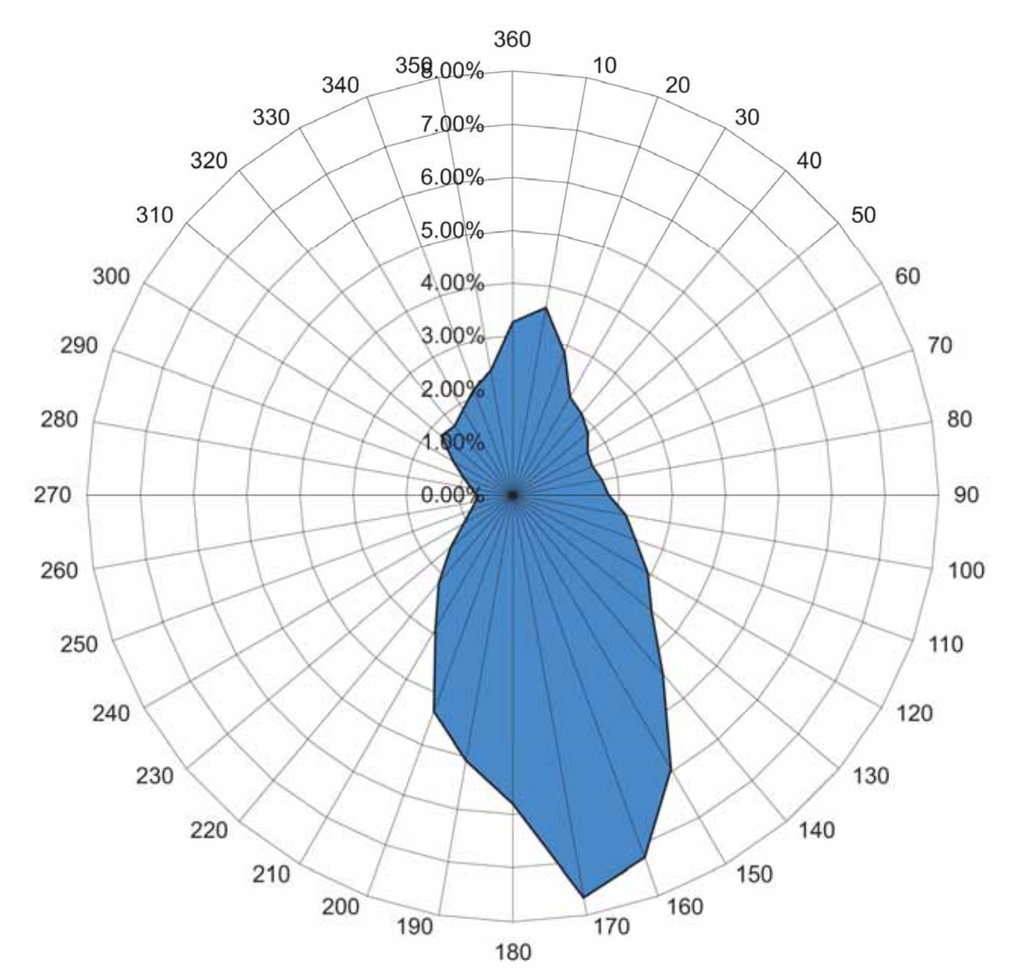
2.6.3 SOUTH

Land use immediately south of the Airport (outside of city limits) is a mixture of agricultural and low-density residential. Land use farther south, inside the City of Wichita Falls, is a combination of industrial, light-industrial, parks, and open space. Land use closer to the downtown area is a mixture of commercial, low- and high-density residential with scattered institutional uses.

2.6.4 WEST

Land use immediately east of the airfield is consumed by Sheppard Air Force Base. Land use west of the base is primarily within city limits and consists of low- and high-density residential with corridors of commercial land use along major roads including Burkburnett Road, Interstate 44, and Highway 287. The majority of residential land use is located between Interstate 44 and Burkburnett Road and between Highway 287 and Iowa Park Road.

FIGURE 2-8
ALL-WEATHER WINDS

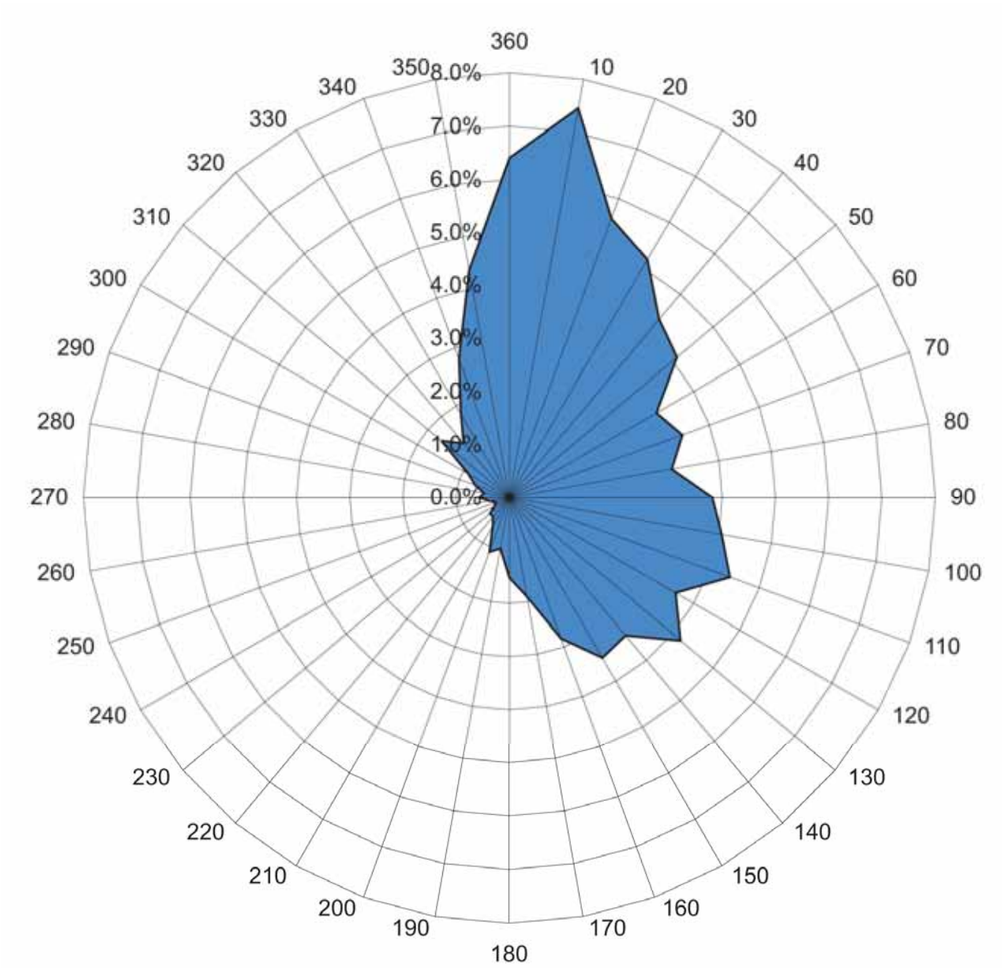


Source: NOAA National Climatic Data Center
Station: 72351 Wichita Falls, Tx
Period of Record: 1999-2008
Compiled by URS Corporation, 2009

Wind Data depicted relative to true north
Runway 17/35 True Bearing 180.49 / 80.49
Runway 15/33 True Bearing 158.24 / 338.25

Note: This graphic depicts the percentage of time that the wind was recording from each compass hearing (excluding calm conditions) during the period 1999 to 2008.

FIGURE 2-9
IFR WINDS



Source: NOAA National Climatic Data Center
Station: 72351 Wichita Falls, Tx
Period of Record: 1999-2008
Compiled by URS Corporation, 2009

Wind Data depicted relative to true north
Runway 17/35 True Bearing 180.49 / 80.49
Runway 15/33 True Bearing 158.24 / 338.25

Note: This graphic depicts the percentage of time that the wind was recording from each compass hearing (excluding calm conditions) during the period 1999 to 2008.

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Wind Data depicted relative to true north
Runway 17/35 True Bearing 180.49 / 80.49
Runway 15/33 True Bearing 158.24 / 338.25

Note: This graphic depicts the percentage of time that the wind was recording from each compass hearing (excluding calm conditions) during the period 1999 to 2008.

FIGURE 2-10
ALL-WEATHER WINDS BY MONTH

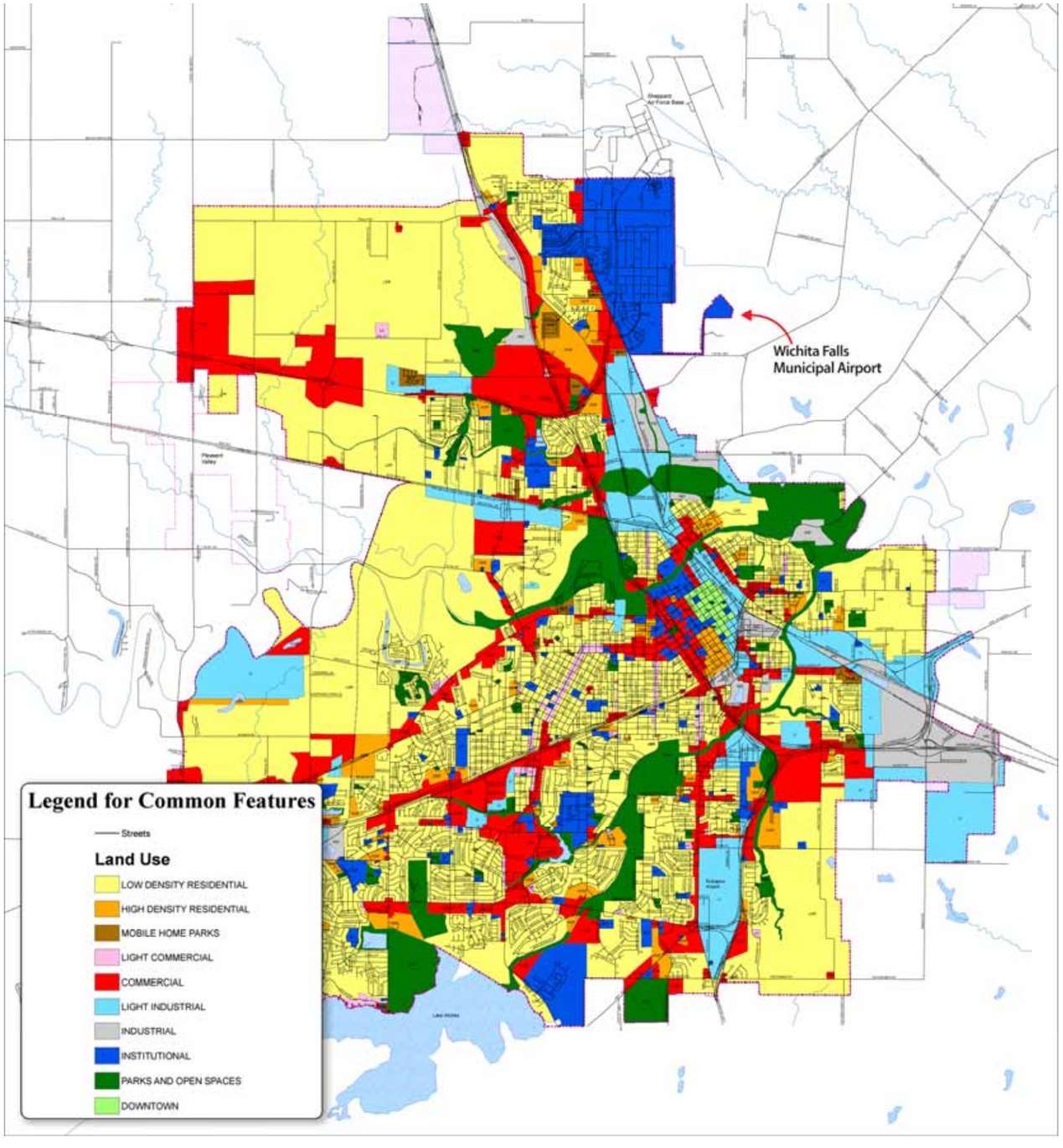


FIGURE 2-11
CITY OF WICHITA FALLS LAND USE MAP

2.6.5 LAND USE CONTROLS

The City of Wichita Falls has adopted airport zoning to prevent the creation of additional incompatible land uses and thereby protect the health, safety, and general welfare of the public in the vicinity of SPS. The city's airport zoning incorporates a series of land use controls that address the allowable height of objects, as well as the compatibility of land uses in areas exposed to high noise levels and areas deemed accident potential zones by the US Air Force. Sheppard Air Force Base has an Air Installation Compatible Use Zone (AICUZ) study that sets forth the information needed for compatible land use planning in the vicinity of Sheppard Air Force Base. The latest amendment to the study was published in August 1999.

2.7 UTILITIES

Utility information for electric, gas, water, and sewer were obtained from a variety of sources including the City of Wichita Falls Engineering Department and the engineering department at Sheppard Air Force Base. **Figure 2-12** provides an illustration of the of utility line locations at the Airport. Brief descriptions of utility services are provided in the following paragraphs.

2.7.1 ELECTRIC SERVICE

Electric service is provided to SPS by Oncor. Aerial lines provide service to the airport's parking lots along the roadway lighting poles on the west side of Armstrong Avenue to a point where the return to terminal loop begins. At that point, aerial lines cross over to the east side of Armstrong Drive and continue along the east side of Armstrong Drive toward the passenger terminal. At the same point, electric service lines continue underground along the west portion of Armstrong Drive between the roadway and the rental car storage lot. A combination of aerial and underground lines provide service to all buildings and other facilities.

2.7.2 NATURAL GAS SERVICE

Natural gas is supplied to SPS by Atmos Energy via a 2 inch underground pipeline that enters along the Airport's south property line and extends toward Hangars 1 and 2. The line then runs along the south side of the road in front of the passenger terminal and the FBO. Service is provided from this line to the passenger terminal.

2.7.3 WATER SERVICE

Water service is provided via a 10 inch water main that runs south of, and parallel to, Taxiway C. The water main is located outside of the municipal airport fence line near the rental car parking storage lot. The main extends northeast toward the passenger terminal and then runs in a southeast direction along the front of the passenger terminal. An additional 4 inch water pipeline runs along the west side of Armstrong Drive also outside of the Airport fence line. Finally, a third 2 inch water pipeline enters airport property from south of Hangars 1 and 2.

2.7.4 SEWER SERVICE

An 8 inch sewer line runs in front of the passenger terminal and extends along the south side of the FBO, Hangars 1 and 2, and the fuel farm. The line then turns south and exits airport property.

2.8 ENVIRONMENTAL INVENTORY

This section provides a brief inventory of environmental resource categories at Wichita Falls Municipal Airport. This inventory focuses on key resources such as wetlands, floodplains, threatened and/or endangered species, DOT Section 4(f) Lands, Historic/Archeological Resources, and Hazardous Materials/Waste Sites, but does not address the full range of environmental resource categories specified in FAA Order 5050.4B. Those additional resource categories will be addressed in subsequent environmental documentation, as necessary. The purpose of this inventory is to identify environmental resources that may be impacted by airport development proposed in subsequent sections.

Wetlands

In July 1993 a wetland inventory was completed for Sheppard AFB by the U.S. Fish and Wildlife Service. This wetland inventory included property leased to the City of Wichita Falls for the Wichita Falls Municipal Airport. Results of the wetland inventory found that there are no wetlands within the City's leasehold.

Although there are no wetlands within this area, a drainage ditch exists immediately south and east of the terminal area that may contain characteristics typical of jurisdictional and/or non-jurisdictional wetlands. If proposed development affects this ditch, a field reconnaissance of the ditch and adjacent drainage area should be performed to determine if wetland characteristics exist and future coordination with the regulatory agencies is required.

Floodplains

FEMA FIRM maps No. 481189-0330-G and 480662-0330-G were examined to determine the presence of the 100-year floodplain in the vicinity of SPS. Results of this review indicated there are no designated 100-year floodplains within, or in the vicinity of, the city's leasehold. Therefore, it was determined that any proposed development would have no impact 100-year floodplains or floodplain values in the vicinity of SPS.

Threatened and/or Endangered Species

Previous data collected for Shepard AFB (Sheppard AFB, 2007) indicate that two state-protected species, the Texas horned lizard (*Phrynosoma cornutum*) and loggerhead shrike (*Lanius ludovicianus*) have been observed on Sheppard Air Force Base. Although these two species are candidates for the federal threatened species list, there are no federally listed threatened or endangered species present on the base at this time. Furthermore, no critical habitat for these species has been identified on site.

No jurisdictional water bodies would be affected by any development proposed in subsequent sections. Since no natural systems or habitat would be affected, impacts to biotic communities are not anticipated.

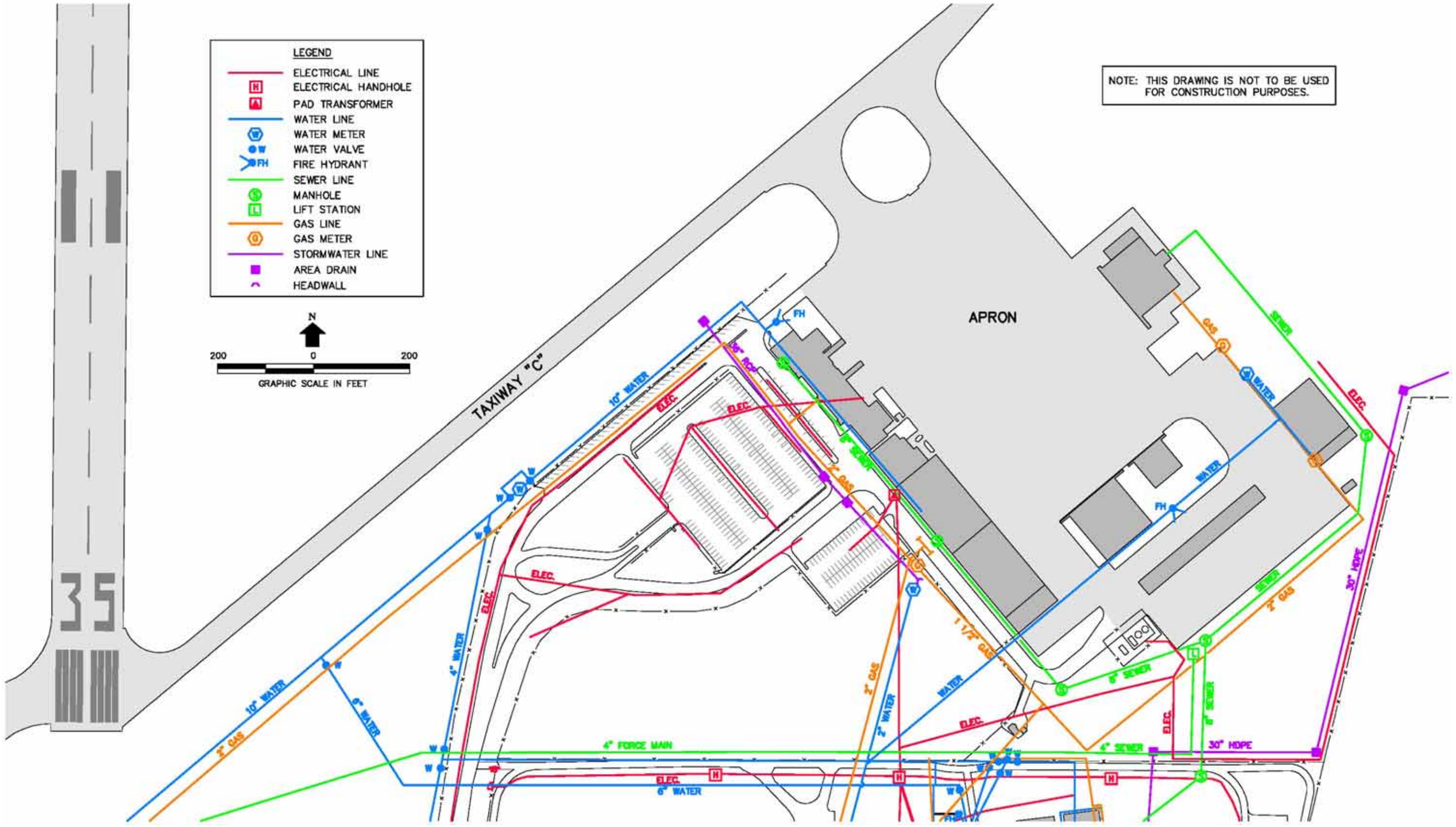


FIGURE 2-12
EXISTING UTILITIES

DOT Section 4(f) Resources

The Department of Transportation (DOT) Act, Section 4(f) provides protection for special properties, including publicly owned lands of a public park, recreation area, or wildlife and waterfowl refuge of national, state, or local significance, or any historic site of national, state, or local significance. There are no Section 4(f) resources located in the vicinity of Wichita Falls Municipal Airport. Therefore, any proposed development within the city's lease would not have a direct impact on Section 4(f) resources. Indirect impacts are also not anticipated, because proposed development would not have the ability to induce aviation activity at SPS to the extent that it could result in increases of the Airport's noise contours.

Historic/Archaeological Resources

The city's lease is located in an area designated for aviation use. This site has been previously disturbed and there is no reason to believe that significant scientific, prehistoric, historic, archaeological, or paleontological resources would be lost or destroyed as a result of any proposed development within the city's leasehold. Prior to the initiation of any construction activities associated with proposed development, early coordination with the Texas State Historic Preservation Officer (SHPO) should be conducted to ascertain if the proposed development has the potential to affect historic and/or archaeological resources.

Hazardous Materials/Waste Sites

A review of existing site documentation (including an Air Force study conducted as part of the 2009 lease re-negotiation) and aerial photography indicates that the city's leasehold is not known to contain significant levels of environmental contamination. If contamination is uncovered, or involved, the development of the project site would be conducted in accordance with federal, state and local guidelines pertaining hazardous materials or environmental contamination.

Development proposed in subsequent sections is unlikely to substantially alter the types of hazardous and other regulated materials used at the Airport. No significant involvement and impact associated with hazardous materials or wastes is anticipated.

SECTION 3.0

Aviation Forecasts

3.0 AVIATION FORECASTS

3.1 INTRODUCTION

The section presents forecasts of aviation demand at Wichita Falls Municipal Airport (SPS) through 2030. These forecasts provide information that will be considered in subsequent sections to determine whether new airport facilities or improvements to existing airport facilities are warranted. In addition, the forecasts provide information regarding the proper timing for any new or improved facilities. Ideally, facilities will be developed at the time they are required, thereby avoiding the costs associated with building too late or too early.

Forecasts of passenger enplanements (i.e., the number of persons boarding commercial aircraft for transportation) will be used in subsequent sections to estimate future demand for passenger handling facilities such as airport roadways, automobile parking, ticket counters, baggage carousels, etc. Likewise, forecast of aircraft operations will be used to determine future demand for aircraft parking apron, hangars, and fueling facilities. The forecasts were prepared on the basis of historical annual activity through 2008 and monthly activity through June 2009.

It should be noted that forecasting consist of educated estimates regarding future activity levels. While past trends, as well as current socioeconomic and industry conditions may provide indications of future activity levels, the actual levels of passenger enplanements and aircraft operations that will occur at SPS are unknown. Thus, the forecasts presented in this section should be reviewed with this fact in mind.

3.2 AIRPORT SERVICE AREA

An airport service area is the geographic region from which an airport derives the majority of its originating passengers. Factors affecting the size of an airport's service area may include topography, roadway access, proximity to competing airports, and the quality of air service provided at competing airports (i.e., airfares, flight frequency, destinations served, number of non-stop flights, aircraft equipment, etc.).

An airport service area was identified for SPS as part of a Passenger Demand Study conducted in 2007 by the consulting firm of Mead and Hunt. The study assessed where tickets were purchased for air travel beginning from SPS. The study used ticketing data for a 1-year period and established an airport service area using zip codes.

Figure 3-1 shows this area in relation to surrounding Metropolitan Statistical Areas (MSAs) and their respective airports that provide commercial air service. As the figure indicates, the service area generally extends halfway to the next competing airport (Lubbock to the west, Lawton to the north, Abilene to the southwest, and Dallas/Ft. Worth (DFW) to the southeast). It is actually somewhat surprising that the service area extends so far toward DFW given the greater air service provided from that airport. However, the number of persons traveling from the outer edges of the service area may be fairly low and may also reflect the cost advantage that travelers taking a long trip could achieve through low cost parking at SPS.

FIGURE 3-1
AIRPORT SERVICE AREA

The service area identified for SPS does not mean that all residents living within the area use SPS for their air travel needs. In fact, the Passenger Demand Study noted that only 47 percent of passengers in the service area are using SPS for their air travel. A higher percentage used DFW (49 percent), while a small percentage used Oklahoma City (4 percent) or Dallas Love Field (1 percent). However, the majority of passengers that use SPS reside or work within the service area.

3.3 SOCIOECONOMIC DATA

Local demographics can be an important factor in determining the demand for air travel. Population, employment and income are all significant factors in determining the demand for air transportation services. Therefore, an examination of local socioeconomic conditions was undertaken to determine whether current and projected trends indicates stronger or weaker demand for air transportation services in the future.

The best indicator of local socioeconomic data for the service area described in the preceding subsection is the Wichita Falls MSA, which consists of the following counties: Archer, Clay, and Wichita Falls. Data for population, employment, and income within the Wichita Falls MSA are presented in the following paragraphs.

3.3.1 POPULATION

Population can be strongly correlated with the demand for air travel in a particular market. Historical decennial populations for the Wichita Falls MSA, Texas, and the United States from 1970 through 2000 are presented in **Table 3-1**. Population in the Wichita Falls MSA has been growing at a slower rate than population growth in Texas and the United States. Texas has experienced exceptionally high population growth as a result of immigration and net in migration from other states; placing it among the fastest growing states in the nation.

Projections by the US Census Bureau and the Texas Office of the State Demographer through the year 2030 indicate that the population of the Wichita Falls MSA, Texas and the United States will grow at a slower rate through the year 2030 than occurred during the last thirty years. The growth rate for Texas is projected to be substantially slower than the exceptionally high growth rates experienced during the preceding decades.

TABLE 3-1
HISTORICAL AND FORECASTED POPULATION

Year	Wichita Falls MSA	Texas	United States
Historical[1]			
1970	126,322	11,198,657	203,211,926
1980	128,348	14,225,512	226,545,805
1990	128,348	16,986,335	248,709,873
2000	140,518	20,851,820	281,421,906
Forecast[2]			
2010	159,225	24,330,646	308,936,000
2020	165,916	28,005,740	335,805,000
2030	169,965	31,830,575	363,584,000
Average Annual Growth Rates			
1970 to 1980	0.2%	2.7%	1.1%
1980 to 1990	0.0%	1.9%	1.0%
1990 to 2000	0.9%	2.3%	1.3%
2000 to 2030 (Proj.)	0.4%	1.4%	0.8%

1 US Census Bureau.
2 Data for US derived from US Census Bureau, 2004. Data for State of Texas and Wichita Falls MSA derived from the Texas State Data Center, Office of the State Demographer, 2008.

3.3.2 EMPLOYMENT

Employment levels in an airport service area provide insight regarding the potential demand for business travel. **Table 3-2** indicates historical employment in the Wichita Falls MSA, Texas, and the United States from 2000 through 2008. The average annual employment growth rate in the MSA has been slower than in Texas and the United States. However, this may also reflect the lower population growth in the Wichita Falls MSA.

TABLE 3-2
HISTORICAL EMPLOYMENT

Year	Wichita Falls MSA	Texas	United States
2000	68,439	9,896,002	138,117,863
2001	69,879	9,991,920	138,241,765
2002	70,411	10,115,299	137,936,672
2003	70,817	10,228,640	138,386,941
2004	71,027	10,385,318	139,988,841
2005	71,182	10,568,414	142,424,336
2006	71,496	10,787,397	145,182,622
2007	70,304	10,972,152	146,610,381
2008	69,305	11,126,436	146,301,625
Average Annual Growth Rates			
2000 to 2008	0.2%	1.5%	0.7%

Source: US Department of Labor, Bureau of Labor Statistics, 2009.

Table 3-3 lists the top ten employers in the Wichita Falls MSA. Sheppard Air Force Base is the dominant employer within the MSA and is six times larger than the next largest employer. The next largest employers are concentrated in the educational, medical, and government sectors.

TABLE 3-3
MAJOR EMPLOYERS IN THE WICHITA FALLS MSA

Rank	Employer	Industry	Employees
1	Sheppard Air Force Base	Military	12,201
2	Wichita Falls School District	Education	2,000
3	North Texas State Hospital	Medical	1,987
4	United Regional Healthcare System	Medical	1,794
5	City of Wichita Falls	Government	1,576
6	Midwestern State University	Education	1,222
7	Howmet Corp Casting Division	Manufacturing	1,020
8	James V Alfred Prison	Government	908
9	AT&T Wireless	Services	761
10	Cryovac	Manufacturing	735

Source: Wichita Falls Chamber of Commerce, June 2008.

An examination of unemployment rates (see **Table 3-4**) reveals that the unemployment rate in the Wichita Falls MSA had been consistently lower than the rate for Texas and the United States. This may be due to the relatively high and stable levels of employment within the government, educational, and medical fields, all of which have been growing as a percentage of total employment nationwide and traditionally show lower levels of fluctuation in employment levels. However, a review of monthly unemployment data

through June 2009 indicated that the unemployment rate in the Wichita Falls MSA has increased and is now slightly higher than the state level.

TABLE 3-4
HISTORICAL UNEMPLOYMENT

Year	Wichita Falls MSA	Texas	United States
2006	4.3	4.9	4.7
2007	4.1	4.4	4.7
2008	4.8	4.9	5.8

Source: US Department of Labor, Bureau of Labor Statistics, 2009.

3.3.3 INCOME

Income is another factor that has a strong bearing on the amount of air travel generated. High income levels are strongly correlated with an increased propensity to use air travel. Per Capita Personal Income for residents in the Wichita Falls MSA was compared to income for residents in Texas and the United States in **Table 3-5**. The table reveals that Per Capita Personal Income in the Wichita Falls MSA is lower than that in the State of Texas and the United States. However, the growth rate of income in the MSA is similar to the income growth rates for Texas and the United States.

TABLE 3-5
HISTORICAL PER CAPITA PERSONAL INCOME

Year	Wichita Falls MSA	Texas	United States
1970	$3,754	$3,633	$4,085
1980	$10,178	$9,880	$10,114
1990	$16,843	$17,421	$19,477
2000	$24,490	$28,317	$29,847
Average Annual Growth Rates			
1970 to 1980	17%	17%	15%
1980 to 1990	7%	8%	9%
1990 to 2000	5%	6%	5%

Source: US Department of Commerce, Bureau of Economic Analysis, Table CA1-3, April, 2009.

3.3.4 SUMMARY

The socioeconomic data presented has a mix of negative and positive implications for future passenger growth at SPS. A summary of these items is provided in the following paragraphs.

Population growth in the Wichita Falls MSA has been slower than in Texas and the United States during the last several decades. Projections of future population growth suggest that this trend will continue. Since population growth is an indicator of passenger enplanements, the data supports a slower growth rate than is forecasted at the state or national level.

Employment data for the Wichita Falls MSA has mixed implications for passenger growth. While the historical growth rate has been slower than the state of national growth rates, the MSA has a high percentage of employment in the government sector which typically fluctuates less than the private sector. Furthermore, the next largest employers are in the medical and educational sectors which have shown positive growth rates. These factors are reflected in the MSA's unemployment rate which had been, until 2009, consistently lower than the state or national rates. In total, employment data suggests slow, but steady growth of business travel.

Per capita personal income for the Wichita Falls MSA is lower than for Texas or the United States. However, the historical growth rate has been similar to the state and national rates. Therefore, per capita personal income data for the Wichita Falls MSA suggests a lower propensity to use air travel, but the rate of growth should be the same as the state and national level. All of these factors will be considered in the development of a recommended forecast for passenger enplanements.

3.4 OVERVIEW OF ECONOMIC CONDITIONS AND INDUSTRY TRENDS

3.4.1 ECONOMIC CONDITIONS

As of July 2009, the United States is in the midst of a severe economic recession that has resulted in substantial contraction of gross domestic product and has been noted for its particularly high level of unemployment. As of June 2009, the national unemployment rate stood at 9.5 percent; the highest rate in 26 years.

The recession was preceded by a high degree of financial leverage across multiple industries and, most especially, the real estate market. Decreasing housing values led to rising defaults on sub-prime mortgages which, in turn, placed severe distress on the financial sector of the economy. This resulted in a significant tightening of credit for all industries and widespread decline in business activity across nearly all sectors of the US economy.

According to testimony given by the Chairman of the US Federal Reserve to the US Congress in June 2009, economic activity may begin growing again during the latter part of 2009 or early 2010 assuming the actions taken by the US Government are successful at stimulating the economy. However, a recovery of the US economy may take more than 2 to 3 years.

3.4.2 AVIATION INDUSTRY TRENDS

In response to prevailing economic conditions the airline industry has been in a state of contraction during 2008 and 2009. The US airline industry instituted significant capacity decreases during the 4th quarter of 2008 by eliminating service to certain markets, decreasing the number of scheduled flights, and decreasing activity at certain hub airports. These capacity reductions, which at the time of their formulation were a response to the spiking price of oil, were fortuitous since they preceded the decrease of passengers resulting from the economic recession. Decreasing passenger demand during the first half of 2009 may spur further capacity decreases at the national level until passenger volumes stabilize and begin to show signs of recovery.

Airline capacity reductions have been the most severe at small- and medium-hub air carrier airports. Large hub airports, such as DFW (which is the dominant hub for American Airlines) have experienced smaller capacity reductions. Commuter airports, such as SPS, while also experiencing declines in passenger demand through the first half of 2009, have generally experienced fewer capacity reductions than larger airports. This is due to the fact that many commuter airports had relatively modest flight schedules to begin with and capacity reductions at these airports may adversely affect passenger demand if flight schedule integrity is not maintained.

The flight schedule at SPS has fluctuated during the 2008 and 2009 dropping from seven daily flights to only three daily flights in October 2008. This service reduction was due to a change of fleet mix from the 34-seat Saab 340 to the 66-seat ATR-72. American Eagle increased capacity in May by adding a fourth daily flight. Furthermore, a review of American Eagle's flight schedule for the 4th quarter of 2009 reveals that a fifth flight is scheduled. While flight schedules can be decreased as quickly as they are increased. The planned increase is an encouraging sign.

The 4th quarter 2009 flight schedule for American Eagle consists of three flights with the ATR-7 and two flights with the EMB-145. This flight schedule results in 298 daily outbound seats; an increase of 13 percent over the 264 daily seats offered by the four ATR-72 flights offered in the 3rd quarter of 2009.

3.5 HISTORICAL AVIATION ACTIVITY

A key factor in attempting to predict future trends affecting passenger levels and aircraft operations at SPS is understanding and analyzing current and past trends at the Airport. Therefore, this section examines and documents those trends and provides the basis for the forecasts presented in the following section. Historical data was obtained from airport management records, air traffic control records, and the Federal Aviation Administration (FAA). An assessment of passenger activity is presented first, followed by an assessment of aircraft operations and based aircraft.

3.5.1 PASSENGER ENPLANEMENTS

Table 3-6 and **Figure 3-2** present total passenger enplanements at SPS from 1980 through 2008. This information was obtained from airport management records, except for 2001, which was obtained from the FAA Terminal Area Forecast (TAF). As the figure indicates, passenger enplanements have generally fluctuated in a range of 50,000 to 60,000 passengers annually from the early 1980's through 2000. In 2001 passenger enplanements declined substantially following the events of September 11, 2001 and the weaker economic conditions that prevailed in the subsequent 2 years. However, passenger enplanements have since recovered some ground and are now at their highest level since 2001.

A Passenger Demand Analysis for SPS, conducted in 2007 by the consulting firm Mead and Hunt, estimated that SPS is capturing approximately 47 percent of the passengers within its catchment area, while 48 percent are driving to DFW. The remaining percentage of passengers used Oklahoma City International Airport, Dallas Love Field, or Lawton-Ft. Sill Airport. The analysis suggested that the drive time to DFW, the frequency and variety of air service at DFW, and the air fare differential between the two airports are the primary reasons why nearly half of the passengers are choosing to fly from an alternate airport. This suggests that the true market size for annual passenger enplanements in the catchment area is approximately 100,000 passengers.

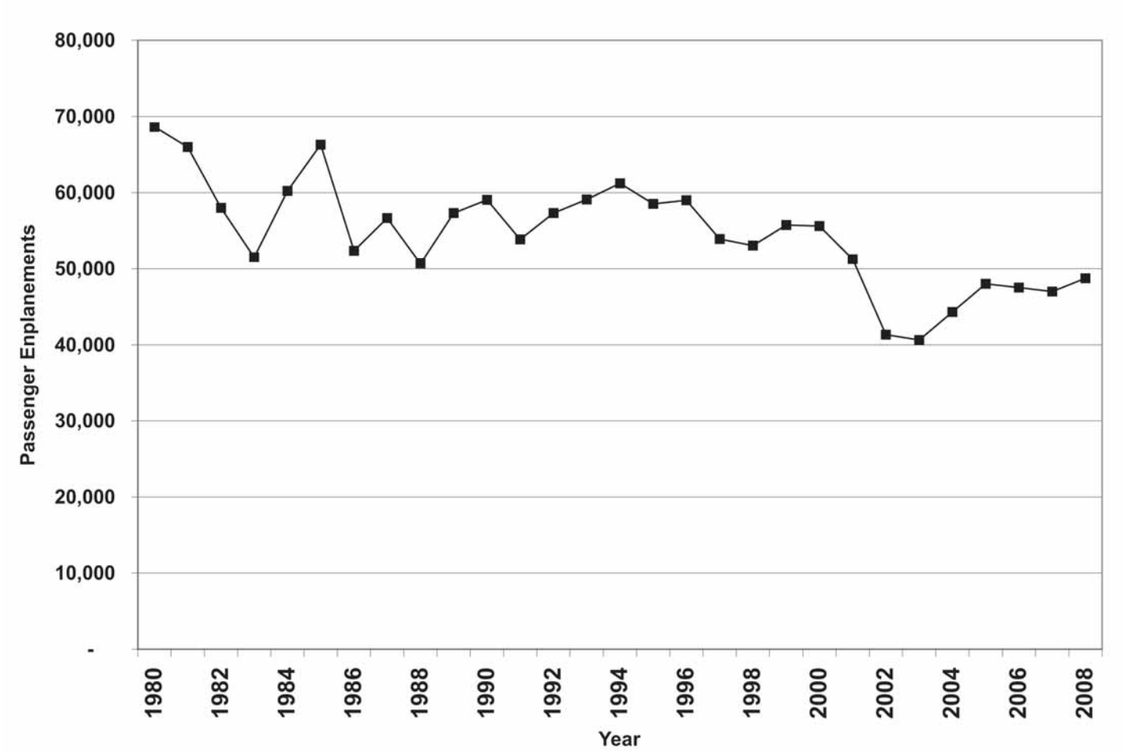
Over the past decade, SPS has been continuously serviced by American Airlines partner American Eagle. Aircraft used to conduct these services have included the Saab 340, the ATR-72, and the Embraer EMB-145.

TABLE 3-6
HISTORICAL ANNUAL PASSENGER ENPLANEMENTS (1980 TO 2008)

Year	Number of Enplanements	Percent Change
1980	68,583	-
1981	65,967	-3.8%
1982	58,003	-12.1%
1983	51,543	-11.1%
1984	60,229	16.9%
1985	66,264	10.0%
1986	52,409	-20.9%
1987	56,677	8.1%
1988	50,703	-10.5%
1989	57,316	13.0%
1990	59,056	3.0%
1991	53,898	-8.7%
1992	57,339	6.4%
1993	59,113	3.1%
1994	61,220	3.6%
1995	58,537	-4.4%
1996	58,996	0.8%
1997	53,942	-8.6%
1998	53,071	-1.6%
1999	55,754	5.1%
2000	55,625	-0.2%
2001	51,286	-7.8%
2002	41,343	-19.4%
2003	40,654	-1.7%
2004	44,337	9.1%
2005	48,028	8.3%
2006	47,518	-1.1%
2007	47,019	-1.1%
2008	48,767	3.7%

Sources: FAA TAF 2008 Scenario, March 2003, for 2001. SPS Records, for years 1980 to 2008.
Note: TAF is fiscal year and airport records are calendar year.

FIGURE 3-2
ANNUAL PASSENGER ENPLANEMENTS (1980 TO 2008)



3.5.2 MONTHLY PASSENGER DISTRIBUTION

Table 3-7 and **Figure 3-3** present monthly passenger enplanement data at SPS from 2004 through 2008. The data reveals that there is no consistent historical peak month. Peak months have occurred in different months during each of the last 4 years. However, the month of May does seem to consistently be in the top 2 to 3 months every year. The peak month accounted for an average of approximately 9.8 percent of annual passenger enplanements during the years 2004 to 2008.

3.5.3 HISTORICAL ANNUAL AIRCRAFT OPERATIONS

Data regarding historical aircraft operations at SPS is limited. Aircraft operations counts at SPS are maintained by the US Air Force. However, traffic counts are kept by both the control tower and by runway supervisory units that assess activity on Runway 15L/33R and Runway 15R/33L. Furthermore, the control tower is not open 24-hours a day and is closed a half-day on Sunday and all-day on Saturday. Consequently, the control tower's counts do not reflect all aircraft operations that occur at the Airport. Consultations with personnel that previously supervised tower operations confirmed that the tower's aircraft operations counts are of questionable accuracy, especially for civilian aircraft.

TABLE 3-7
HISTORICAL MONTHLY PASSENGER ENPLANEMENTS (2004 TO 2008)

Month	2004	Percent of Year	2005	Percent of Year	2006	Percent of Year	2007	Percent of Year	2008	Percent of Year
January	2,807	6.2%	4,093	9.0%	3,250	7.2%	2,569	5.7%	3,253	7.2%
February	3,330	7.4%	3,435	7.6%	3,372	7.5%	3,312	7.3%	3,573	7.9%
March	3,869	8.6%	3,977	8.8%	4,165	9.2%	4,021	8.9%	4,056	9.0%
April	3,937	8.7%	4,040	8.9%	3,704	8.2%	3,640	8.0%	4,168	9.2%
May	**4,299**	**9.5%**	4,330	9.6%	**4,316**	**9.5%**	4,431	9.8%	4,393	9.7%
June	3,895	8.6%	4,324	9.6%	4,082	9.0%	4,133	9.1%	4,491	9.9%
July	4,071	9.0%	3,880	8.6%	4,063	9.0%	4,211	9.3%	**4,531**	**10.0%**
August	3,821	8.4%	3,987	8.8%	3,847	8.5%	**4,455**	**9.8%**	4,392	9.7%
September	3,808	8.4%	**4,570**	**10.1%**	3,833	8.5%	4,127	9.1%	4,058	9.0%
October	3,854	8.5%	4,393	9.7%	4,171	9.2%	4,434	9.8%	3,827	8.5%
November	3,685	8.1%	4,229	9.4%	4,287	9.5%	3,772	8.3%	3,560	7.9%
December	3,853	8.5%	4,264	9.4%	3,662	8.1%	3,646	8.1%	3,688	8.2%

Source: SPS, Airport Master Plan Records, compiled by URS Corporation, 2009.
Note: **Bold** type indicates peak month.

Another source of data for aircraft operations is the FAA's Enhancement Traffic Management System Counts (ETMSC). This on-line database provides FAA counts of aircraft operations to and from SPS that enter the en route airspace system. The en route airspace system consists of high altitude airspace controlled by Air Route Traffic Control Centers. Data from this source has significant limitations because it does not include local aircraft operations or even itinerant aircraft operations that do not enter the en route system. According to recent research, ETMSC data accounts for as little as 15 percent of aircraft operations at airports with less than 100,000 annual enplanements. However, for certain categories of aircraft operations (i.e., flights that always file Instrument Flight Rules (IFR) flight plans and are typically controlled by Centers) this data may be of value.

Table 3-8 presents historical aircraft operations data at SPS for the air carrier and freight categories (obtained from the ETMSC) from 2002 through 2008. The air carrier category in ETMSC includes both commuter and air carrier aircraft. This includes air carrier aircraft that are destined to Sheppard Air Force Base, as well as diversions from DFW due to weather. Therefore, the values shown in the table include more than just scheduled airline operations at SPS.

3.5.3.1 Air Carrier and Commuter Aircraft Operations

For air traffic count purposes, the FAA defines air carrier aircraft as having a seating capacity of more than 60 seats. Commuter aircraft are defined as aircraft with 60 seats or less. In recent years this boundary has blurred as commuter airlines now commonly operate aircraft having more than 60 seats, such as the ATR-72 and larger regional jets in the 70 to 90 seat range.

FIGURE 3-3
MONTHLY PASSENGER ENPLANEMENTS (2004 TO 2008)

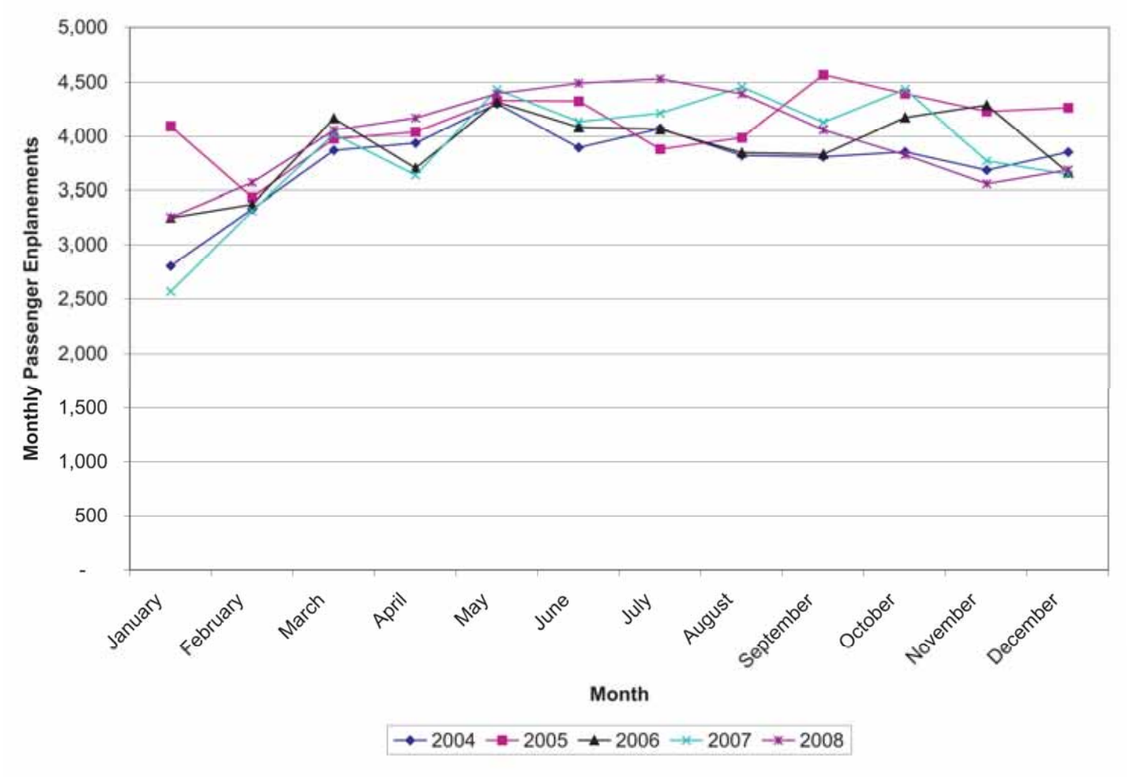


TABLE 3-8
HISTORICAL SPS AIRCRAFT OPERATIONS FROM ETMSC

Year	Aircraft Operations	
	Air Carrier	Freight
2002	4,546	669
2003	4,577	732
2004	4,859	716
2005	5,853	681
2006	5,172	717
2007	4,767	634
2008	5,287	604

Source: FAA, ETMSC, 2009.

For the purposes of this discussion, the term air carrier will refer to larger aircraft such as the B-737 and the MD-80. Commuter will refer to aircraft operated by American Eagle such as the ATR-72 and EMB-145.

Air carrier aircraft operations at SPS consist primarily of charter flights. A review of airport records indicate SPS experiences approximately 10 to 15 charter flights per year with these types of aircraft.

Historical commuter operations are in the range of 4,000 to 5,000 annually. These values appear to match historical airline operations of six to eight daily flights.

3.5.3.2 Cargo Operations

Scheduled air cargo operations occur at SPS with Beech-99 aircraft. These flights are operated by Ameriflight for UPS. As shown in Table 3-8, these flights have averaged between 600 and 700 operations per year.

3.5.3.3 General Aviation Operations

General aviation includes all segments of the aviation industry with the exception of commercial air service and military operations. Typical general aviation activities include pilot training, corporate, and recreational flying. Operations are conducted by single- and multi-engine piston aircraft, turboprop and turbojet aircraft, and helicopters.

General aviation operations are recorded as local or itinerant. Local operations are primarily those arrivals or departures performed by aircraft remaining in the airport traffic pattern, and are most often associated with training activity and flight instruction. Itinerant operations are arrivals or departures other than local operations, performed by either based or transient aircraft.

According to the Airport Facility Directory transient aircraft at SPS are limited to one full stop landing during student training. Therefore, the number of local operations at SPS must be very low. It is estimated that general aviation aircraft conduct 10,000 annual operations at SPS.

3.5.4 MILITARY

Total military operations at SPS are in the range of 300,000 annually. These operations primarily consist of jet and propeller trainers such as the T-37/T-38 and T-6, as well as transient high-performance fighter jets such as the F-16 and F-15.

3.5.5 BASED AIRCRAFT

Historical records are not maintained on based aircraft at SPS. Previous FAA 5010 forms were not of value because they include military aircraft based at Sheppard Air Force Base. There are 21 civilian aircraft currently based at the Airport. They include 3 jets, 4 turboprops, 7 multi-engine piston aircraft, and 7 single-engine piston aircraft. The number of based aircraft has been fairly constant in recent years.

3.6 AVIATION FORECASTS

This section presents forecasts of passenger enplanements, aircraft operations, and based aircraft. Forecasts from independent sources are also presented to provide a point of reference.

3.6.1 FORECASTING METHODOLOGIES

Methodologies commonly used for forecasting include regression analysis, trend analysis, and market share analysis. All of these methodologies are based on the premise that historical trends of relationships can be used to predict future activity levels. A description of each methodology is provided as follows:

- **Regression Analysis:** This method projects aviation activity (the dependent variable) on the basis of one or more economic indicators such as population, per capita personal income, employment, gross national product, or other socioeconomic factors (the independent variables). Historical values for both the dependent and independent variables are tested using a correlation analysis to determine whether a relationship exists. If a significant relationship is found, it can be used to forecast future aviation activity on the basis of the relationship continuing into the future and a forecast of the independent variable from other sources.

- **Trend Analysis:** This type of analysis is one of the simplest forecasting techniques. The method fits growth lines to historical data and extends them into the future. This methodology assumes that the same factors affecting aviation activity in the past will continue to do so in the future.

- **Market Share Analysis:** This analytical tool involves a review of the historical activity levels at the Airport as a percentage share of a larger market. For instance, the number of based aircraft at the Airport is compared to the total number of based aircraft in the region, state, or nation. This share factor is compared to forecasts of the larger areas to determine the likely future activity levels at the Airport.

These three statistical techniques assume that previous relationships will continue to exist in the future. Consequently, these methods do not allow for the effects of more aggressive marketing, increased service levels, or other changes occurring independently of past relationships. To counter this weakness, the second phase of forecasting involves applying professional judgment. During this phase, decisions are made about the validity of forecasts resulting from the analytical analyses. Intangible factors are then considered when developing a preferred forecast.

3.6.2 PASSENGER ENPLANEMENTS

A forecast of passenger enplanements is needed to size a variety of facilities at the Airport including access roadways, the passenger terminal, automobile parking, etc. A review of independent forecasts is followed by updated forecasts using the methodologies discussed.

3.6.2.1 Independent Forecasts of Passenger Enplanements

The only independent forecast of passenger enplanements at SPS is the FAA's 2008 TAF. The FAA publishes a forecast referred to as the TAF that contains activity projections through 2025 for all airports included in the National Plan of Integrated Airport Systems. The most recent TAF was released in December of 2008. It projects a flat level of approximately 48,000 passengers annually at SPS through the entire forecast period.

3.6.2.2 Updated Forecasts of Passenger Enplanements

Regression Analysis

Regression analyses were conducted using historical passenger enplanements and historical socioeconomic variables for population, total employment, and per capita personal income in the Wichita Falls MSA. Simple regressions were run on each of the socioeconomic variables and multiple regressions were run using these economic variables in combination. The results of the regressions analyses revealed that the socioeconomic variables did not have much correlation with historical passenger enplanements and, therefore do appear to be suitable for predicting future passenger enplanements at SPS. Consequently, regression analysis was not used to forecast passenger enplanements at SPS.

Trend Analysis

Trendline forecasts were prepared for SPS using a long-term trendline and a short-term trendline. The long-term trendline used historical passenger enplanements at SPS from 1975 through 2008. The resulting trendline indicates negative future growth rates. The short-term trendline used historical passenger from 2002 through 2008. This trendline reflects the more recent positive growth trends at the Airport. The resulting trendline indicates positive growth into the future. Table 3-9 presents the two trendlines. The long-term trendline shows passenger enplanements bottoming out at just over 40,000 annual passengers, which is equivalent to the low experienced in the 2001-2002 timeframe. Conversely, the short-term trendline shows passenger enplanements peaking at 79,000, which is equivalent to the passenger levels experienced at SPS in the late 1970's. Neither of these forecasts, by themselves, reflects a realistic forecast of passenger enplanements at SPS. However, they do establish a basis for the potential high and low range of passenger enplanements.

Market Share Analysis

Market share forecasts were prepared for SPS using the FAA's TAF for passenger enplanements in the State of Texas. A comparison of historical passenger enplanements at SPS with historical passenger enplanements in Texas for the period 1990 through 2008 revealed that SPS's share of passenger enplanements has been declining. Passenger enplanements at SPS accounted for 0.12 percent of passenger enplanements in Texas in 1990, but decreased to 0.07 percent by 2008. This is because passenger enplanements at SPS have been declining, while passenger enplanements in Texas have been growing.

TABLE 3-9
STATISTICAL FORECASTS OF PASSENGER ENPLANEMENTS VERSUS 2008 TAF

Year	FAA 2008 TAF	Short-Term Trendline	Long-Term Trendline	Constant Market Share	Variable Market Share
2010	48,641	52,199	52,176	48,190	44,776
2015	48,641	59,018	49,455	55,544	47,638
2020	48,641	65,836	46,735	64,339	45,984
2025	48,641	72,654	44,015	72,878	41,670
2030	48,641	79,473	41,294	-	-
Average Annual Compound Growth Rate					
2010 to 2025	0.0%	2.2%	-1.1%	2.8%	-0.5%

Source: URS Corporation, 2009.

Two market share forecasts were explored. The first forecast holds SPS's current market share constant and applied that share to the forecast of the State of Texas enplanements through 2025. This forecast results in approximately 72,000 passengers at SPS by 2025. The second forecast gradually varies SPS's market share downward to 0.04 percent to reflect past decreases in market share. This forecast predicts approximately 41,000 passenger enplanements by 2025.

Table 3-9 presents the results of the statistical forecasts and compares them to the FAA's TAF. As the table indicates, there is significant disparity between the results of the forecasts. The short-term trendline shows a rapid increase of passengers because passengers have been increasing at the Airport during the last 5 years. The long-term trendline indicates negative growth because the long-term trend of passenger at SPS since the 1970's has been negative. Similar results are obtained with the constant and variable market share forecasts.

Non-Statistical Factors

While statistical approaches to forecasting have their uses, they are not always the most appropriate approach to forecasting passenger enplanements. Local factors can have a significant effect on the passenger enplanements and should be closely examined. The following paragraphs address local market factors that may affect future passenger enplanements at SPS.

Consultation with American Eagle personnel revealed that approximately 60 percent of passengers at SPS are military personnel conducting training or business at Sheppard Air Force Base. Therefore, more than half of the passengers at the Airport are dependent upon the future plans and operation of Sheppard Air Force Base, rather than the socioeconomic variables of the Wichita Falls MSA.

Consultation with representatives of Sheppard Air Force Base revealed that in addition to current training operations, the base may be assigned additional training missions in the near future. Further discussion of this issue revealed that growth of one of these missions, related to non-commissioned officers, could generate up to 2,000 additional passenger annually over current levels.

Another important local factor is that the only scheduled passenger service at SPS is provided by American Eagle to DFW. Consequently, future passenger levels will be highly dependent on the number of flights and the type of equipment used for this service. The number of flights provided by American Eagle will depend on the load factors achieved on existing flights. Airlines typically consider increasing flight schedules when load factors indicate demand for additional flights. Flights can also be added for overall schedule integrity by matching to banks of flights at hub airports.

Regarding the issue of equipment type, American Eagle operates a fleet of turboprops and regional jets. Turboprops operated by American Eagle include the ATR-72 (66 seats). Regional jets include the EMB-145 (50 seats) and the CRJ-700 (70 seats), although the CRJ-700 is not currently flown to SPS. American Eagle does not currently have orders for any additional aircraft. However, the company announced in September 2009 that it is exercising options for 22 additional CRJ-700 aircraft. These regional jets are planned to operate from the airline's Chicago hub and would not affect operations at SPS. AMR Corporation has stated in its annual report that it intends to divest American Eagle when economic conditions improve. Therefore, any future aircraft orders by American Eagle (or a new owner) would most likely consist of advanced turboprop or regional jet aircraft in the 50 to 70 seat category. Any new regional jets would almost certainly be at the high end of that seating scale due to their better operating economics.

The 2007 Passenger Demand Study conducted for SPS concluded that the potential for scheduled service from SPS to another airline's hub (such as Houston or Phoenix) is unlikely. Therefore, it is assumed that American Eagle will remain the only scheduled air service provider at the Airport.

With respect to charter service, the same type of service is expected to continue at approximately the same rate as during the last several years.

Other local qualitative factors were considered in the development of a forecast including the following:

1. The Wichita Falls MSA will experience population, employment, and income growth consistent with historical trends and projections, as previously described.
2. The airport's service area will remain the same size. No new commercial service airports are planned nearby that could decrease passenger demand. Significant diversion of passengers in the service area to alternate airports, such as DFW will likely continue in the future due to differences in air fares, non-stop flights, destination options, and equipment preferences.
3. Airport facilities such as automobile parking, passenger terminal space, etc. will be expanded at SPS as needed to meet passenger demand levels. Facility constraints will not suppress passenger demand.
4. The current system of air service with commuter aircraft connecting to a hub airport will remain the prevailing business model of scheduled commercial air service. No non-stop flights to destinations other than DFW are currently anticipated from SPS other than by charter flights.
5. Commuter aircraft in the 50- to 70-seat range will continue to be the primary type of equipment operated at SPS. Aircraft with smaller seating capacities have become increasing uneconomical to operate and will not be assumed to occur in the future.
6. Recessionary conditions will continue to prevail through the later part of 2009 or early part of 2010. Economic growth in the next few years will be weaker than historical levels and the economy will not recover to pre-recession levels for a period of 2 to 3 years.

In consideration of historical trends, statistical analyses, and the local factors described above, a baseline, low-growth, and high-growth forecast of passenger enplanements were developed. These forecasts are described in the following paragraphs.

Passenger enplanements at SPS decreased 16 percent compared to the first 6 months of 2008. However, the rate of decline has been decreasing each month. Furthermore, as previously noted, American Eagle is scheduled to increase the number of flights at SPS in the 4th quarter. This should stimulate demand by providing passenger's with a greater choice regarding schedule. Considering these factors, the baseline forecast assumes that passenger enplanements in 2009 will be roughly 10 percent lower than passenger enplanements in 2008. The baseline forecast also assumes a 3-year recovery that will result in passenger enplanements reaching their 2008 level again in 2011. After that, passenger enplanements are projected to growth at an average annual rate of one percent. The baseline forecast predicts that passenger enplanements will reach approximately 59,000 by the year 2030.

The low-growth forecast assumes that a longer recovery period of 4 years will be required and that passenger enplanements will growth at an average annual rate of 0.5 percent. This results in a passenger forecast of 53,000 annual passengers in 2030. The high-growth forecast assumes a recovery period of 2 years and assumes a growth rate of 1.5 percent resulting in a forecast of approximately 65,000 passengers in 2030. **Figure 3-4** provides an illustration of these forecasts. **Table 3-10** presents the forecast values in key 5-year increments.

TABLE 3-10
UPDATED FORECASTS OF PASSENGER ENPLANEMENTS

Year	Baseline Forecast	Low-Growth Forecast	High-Growth Forecast
2010	46,000	44,000	49,000
2015	51,000	50,000	53,000
2020	53,000	51,000	57,000
2025	56,000	52,000	61,000
2030	59,000	53,000	66,000
Average Annual Compound Growth Rate			
210 to 2030	1.0%	0.5%	1.5%

Source: URS Corporation, 2009.
Note: All numbers rounded to the nearest thousand.

The majority of these passenger enplanements will be on scheduled airlines. However, a small portion of passenger will occur on charter airlines consistent with historical levels. Data from 2005 through 2008 indicated that annual passengers on charter flights ranged between 1,200 and 2,000. Annual charter passengers are estimated to remain in this range through the forecast period.

3.6.3 AIRCRAFT OPERATIONS

3.6.3.1 Air Carrier Operations

Operations by air carrier aircraft will continue to be a function of the number of annual charter flights. It is estimated that these flights will be in the range of 10 to 20 flights per year. This represents 20 to 40 operations annually. It should be noted that in addition to charter flights, SPS will continue to receive diversions of air carriers from DFW Airport during periods of inclement weather in Dallas. Data from the FAA's ETMSC suggests that there are approximately 40 of these flights per year.

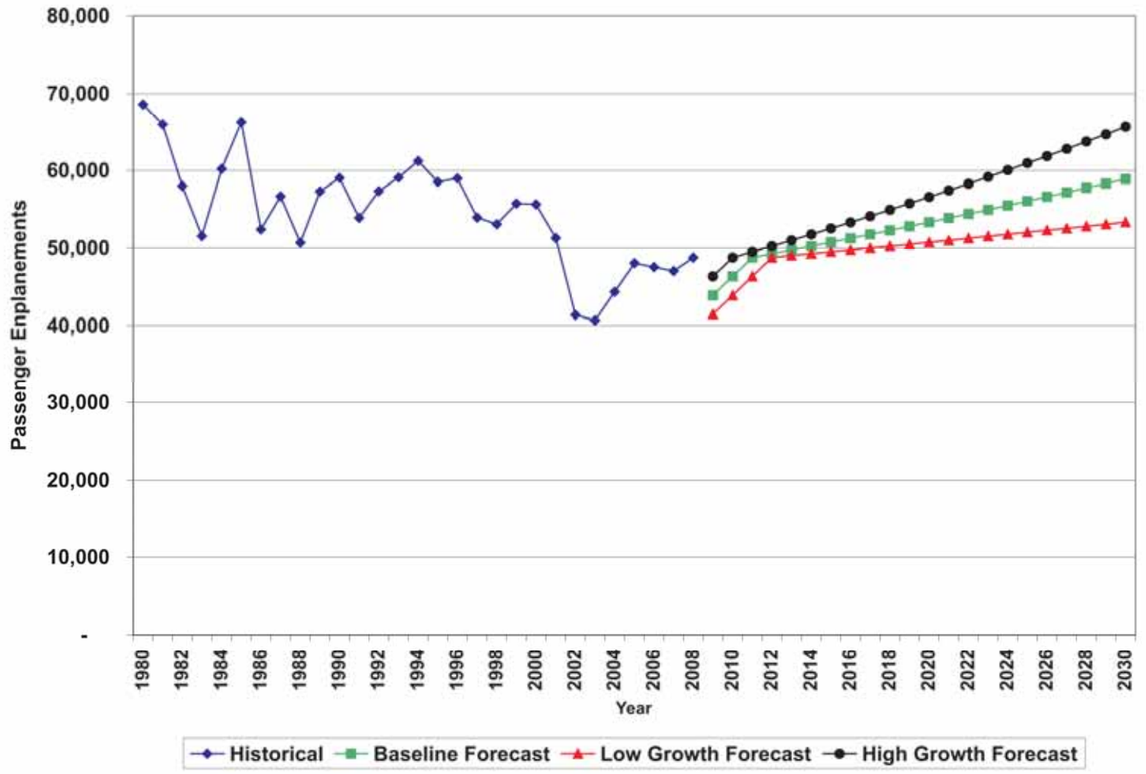
3.6.3.2 Commuter

The future number of aircraft operation conducted by scheduled airlines at SPS can be estimated on the basis of the likely number of daily flights. A schedule of five daily flights equates into 3,650 annual operations. A schedule of six daily flights equates to 4,380 annual operations. Thus, future commuter operations are projected to be in the range of 4,000 to 4,500 annually.

3.6.3.3 General Aviation

General aviation operations consist of arrivals and departures by all segments of the civilian aviation industry, except for airline operations. It includes a diverse range of aviation activities including business, agricultural, training, and recreational flying. A forecast of general aviation activity is needed to project the future demand for general aviation facilities.

FIGURE 3-4
UPDATED FORECASTS OF PASSENGER ENPLANEMENTS



General aviation activity at SPS will consist of operations by based aircraft, as well as itinerant aircraft visiting SPS for leisure or business purposes. It is likely that a significant portion of smaller general aviation aircraft will use Kickapoo Downtown Airport due to its proximity to the City of Wichita Falls and the lack of high-density military operations that prevail at SPS. Thus, it is likely that SPS will receive primarily the larger general aviation aircraft that cannot operate from the 4,450-foot runway at Kickapoo Downtown Airport and flights that need an Instrument Landing System (ILS) approach. Annual general aviation operations are assumed to continue at the level of approximately 10,000 annual operations.

3.6.3.4 Military

No significant change is anticipated to occur in the number of annual aircraft operations by military aircraft. The majority of these operations will be touch-and-go's by T-38 and T-6 trainers. A level of 300,000 annual operations is assumed to continue in the future.

3.6.3.5 Forecast of Total Aircraft Operations

Using the basic levels of aircraft operations described in the preceding sections, a forecast of total aircraft operations was derived and is presented in **Table 3-11**. On basis of recent tower data, it is estimated that approximately 240,000 of the estimated 300,000 annual military aircraft operations are local operations (i.e., touch-and-go's). Local operations by civilian aircraft are unrecorded and therefore are unknown, but estimated to be no more than 500 annually. Civilian touch-and-go's primarily occur during weekends when the air traffic control tower is closed and few military operations occur.

TABLE 3-11
FORECAST OF TOTAL AIRCRAFT OPERATIONS

Year	Air Carrier	Commuter	General Aviation	Military	Total
2010	80	4,000	10,000	300,000	314,080
2015	80	4,500	10,000	300,000	314,580
2020	80	4,500	10,000	300,000	314,580
2025	80	4,500	10,000	300,000	314,580
2030	80	4,500	10,000	300,000	314,580

Source: URS Corporation, 2009.

3.7 FORECAST OF BASED AIRCRAFT

As noted in Section 3.5.5, no records are maintained regarding historical levels of based aircraft at SPS. There are currently 21 civilian aircraft that are primarily based at SPS. This includes 7 single-engine piston aircraft, 7 multi-engine piston aircraft, 4 turboprops, and 3 jets.

The FAA's annual *Aerospace Forecast* projects the number of active aircraft across the United States. The FAA's *2008 Aerospace Forecast* estimates that the active fleet of general aviation aircraft will increase at 1.4 percent annually through the year 2025. However, this growth rate is a composite value that applies to the general aviation fleet as a whole. Certain types of general aviation aircraft and certain parts of the country will experience different rates of growth or declines as older aircraft are retired.

The FAA forecast notes that growth rates for different categories of aircraft will diverge significantly. In the case of single-engine aircraft, an annual growth rate of only 0.5 percent is projected. Multi-engine piston aircraft are projected to decline at a rate of 0.9 percent annually. On the other hand, growth of high performance aircraft is expected to be more substantial. The turboprop fleet is projected to grow at an annual rate of 1.6 percent, while the jet fleet is projected to grow at an annual rate of 5.6 percent.

The higher growth rates associated with the higher performance aircraft reflects that fact that these aircraft were benefiting from the growth of corporate flight departments and fractional ownership programs until the recent economic recession. It should also be noted that the higher growth rates for jet aircraft are likely to be revised downward by the FAA given the substantial setbacks recently suffered by the Very Light Jet industry since the bankruptcy of Eclipse Aviation.

While the use of FAA growth rates is often used in cases where local data regarding the growth of based aircraft is not available, there are factors unique to the Wichita Falls market that need to be considered. It is anticipated that any growth of single-engine or twin-engine piston aircraft will be drawn to Kickapoo Downtown Airport due to its proximity to downtown and the majority of residential development. Kickapoo Downtown Airport's location and ease of use will be primary draws for future general aviation aircraft that are based in the Wichita Falls area. Any growth of general aviation aircraft at SPS are more likely to be high-performance aircraft that are not capable of operating from Kickapoo Downtown Airport's runway length of 4,450 feet or that require precision instrument landing capability.

Given these factors, no growth is projected for single or multi-engine piston aircraft at SPS. Growth may occur in the turbo-prop and jet categories, but is expected to be modest and would likely consist of just a few aircraft. **Table 3-12** presents a forecast of based aircraft through 2030.

TABLE 3-12
FORECAST OF BASED AIRCRAFT

Year	Single-Engine Piston	Multi-Engine Piston	Turbo-Prop	Jet	Total
2010	7	7	4	3	21
2015	7	7	4	4	22
2020	7	7	5	4	23
2025	7	7	5	5	24
2030	7	7	5	5	24

Source: URS Corporation, 2009.

3.8 FORECAST OF PEAKING CHARACTERISTICS

Information concerning the peaking characteristics of passenger enplanements and aircraft operations is required to determine the demand for various airport facilities. This information will be used in the facility requirements presented in the next section. The following definitions were observed in determining and presenting peaking information:

- **Peak Month** – The month when the greatest number of passenger enplanements or aircraft operations occur.
- **Average Day, Peak Month** – The average day during the peak month (i.e., the monthly value divided by 30 days).
- **Peak Hour** – The peak hour during the average day of the peak month.

3.8.1 PASSENGERS

Forecasts of peak hour enplanements are used to determine the future demand for facilities primarily used by departing passengers, such as ticket counters and departure holdrooms. The forecast of peak hour deplanements will be used to assess the demand for facilities used by arriving passengers, such as baggage claim facilities. Likewise, the forecasts of total peak hour passengers will be used to determine the future demand for facilities used by passengers arriving and departing at the same time. These facilities include all general circulation areas, rest rooms, concessions, rental car counters, and terminal curb.

A review of the historical passenger levels at SPS revealed the monthly distribution of enplanements and deplanements are essentially the same. Therefore, for the purpose of this study, it will be assumed peak month enplanements and peak month deplanements percentages will be the same. The overall number of deplanements are 10 to 15 percent lower than enplanements.

From 2004 through 2008 the peak month for passenger enplanements has averaged 9.8 percent of annual enplanements. The highest peak month recorded during that time was 10.1 percent. Therefore, a factor of 10 percent was applied for estimated future peak month passengers. **Table 3-13** shows the peak month values through the forecast period.

TABLE 3-13
PEAKING FORECAST FOR PASSENGER ENPLANEMENTS

Year	Annual Passenger Enplanements	Peak Month Passenger Enplanements (10 Percent)	Average Day Peak Month Enplanements (30 Days)	Peak Hour Enplanements (33 Percent)
2010	46,329	4,633	154	51
2015	50,747	5,075	169	56
2020	53,336	5,334	178	59
2025	56,056	5,606	187	62
2030	58,916	5,892	196	65

Source: URS Corporation, 2009.

Average day peak month (ADPM) passenger enplanements are equal to the peak month divided by 30 days. The resulting values are also shown in the table.

Peak hour passenger enplanements are typically calculated by examining the hourly flight schedule for an airport and applying some assumptions regarding load factor. This process must be applied with caution to SPS, because it does not reflect the absolute peak that occurs. While the scheduled peak hour at SPS may consist of a full ATR-72 flight (i.e., 66 passengers) the actual peak hour can be much higher when a charter flight occurs.

If a charter flight overlaps with scheduled operations, the actual peak could be a full scheduled flight (66 passengers) plus a full charter flight (150 passengers). Therefore, an actual peak hour could be as much as 216 passengers, far higher than a typical peak of one full scheduled flight.

The peak can also be higher when weather causes a flight delay. This may result in passengers for two different flights being inside the terminal at the same time. Table 3-13 indicates a base level of peak hour passengers at 33 percent of daily passengers. However, facility designs will need to account for the higher peaks that occur with charter operations and weather-related events.

3.8.2 AIRCRAFT OPERATIONS

As previously noted, data regarding aircraft operations at SPS is of limited accuracy. Consequently, data regarding the peaking characteristics of aircraft operations is also limited. Monthly operations counts were obtained from the air traffic control tower for 2008. However, cross checking of this data to the FAA's Enhanced Traffic Management System counts revealed that the tower's records do not capture all aircraft operations. While the tower data indicates a peak month or 11.5 percent of annual activity, experience at other airports indicate that a peak month in the range of 10 percent is more likely. Using a monthly peaking value of 10 percent and an hourly peaking value of 15 percent, results in the peaking forecast shown in **Table 3-14**.

TABLE 3-14
PEAKING FORECAST – TOTAL AIRCRAFT OPERATIONS

Year	Annual Aircraft Operations	Peak Month Aircraft Operations (10 Percent)	Average Day Peak Month Operations (30 Days)	Peak Hour Aircraft Operations (15 Percent)
2010	314,080	31,408	1,047	157
2015 to 2030	314,580	31,458	1,049	157

Source: URS Corporation, 2009.

Table 3-15 shows the same information just for the civilian aircraft operations.

TABLE 3-15
PEAKING FORECAST FOR CIVILIAN AIRCRAFT OPERATIONS

Year	Annual Aircraft Operations	Peak Month Aircraft Operations (10 Percent)	Average Day Peak Month Operations (30 Days)	Peak Hour Operations (15 Percent)
All-Years	10,000	1,000	33	5

Source: URS Corporation, 2009.

3.9 SUMMARY OF AVIATION FORECASTS

A summary of the forecasts contained in this section is presented in **Table 3-16.**

TABLE 3-16
SUMMARY OF FORECASTS

Forecast Element	Year				
	2010	2015	2020	2025	2030
Passenger Enplanements					
Total	46,329	50,747	53,336	56,056	58,916
Peaking Characteristics					
Peak Month	4,633	5,075	5,334	5,606	5,892
Average Day, Peak Month	154	169	178	187	196
Peak Hour, Average Day	51	56	59	62	65
Aircraft Operations					
Itinerant					
Air Carrier	80	80	80	80	80
Commercial	4,000	4,500	4,500	4,500	4,500
General Aviation	9,500	9,500	9,500	9,500	9,500
Military	60,000	60,000	60,000	60,000	60,000
Local					
General Aviation	500	500	500	500	500
Military	240,000	240,000	240,000	240,000	240,000
Total	314,080	314,580	314,580	314,580	314,580
Peaking Characteristics					
Peak Month	31,408	31,458	31,458	31,458	31,458
Average Day, Peak Month	1,047	1,049	1,049	1,049	1,049
Peak Hour, Average Day	157	157	157	157	157
Peaking Characteristics for Civilian Aircraft Only					
Peak Month	1,000				
Average Day, Peak Month	33				
Peak Hour, Average Day	5				
Based Aircraft					
Single Engine Piston	7	7	7	7	7
Multi-Engine Piston	7	7	7	7	7
Turboprop	4	4	5	5	5
Jet	3	4	4	5	5
Total	21	22	22	23	24

Source: URS Corporation, 2009.

SECTION 4.0

Facility Requirements/Terminal Programming

4.0 FACILITY REQUIREMENTS/TERMINAL PROGRAMMING

4.1 INTRODUCTION

This section assesses the facility requirements at Wichita Falls Municipal Airport (SPS) on the basis of the aviation activity forecasts presented in the previous section, as well as consultations with airport tenants and airport management. The capacities of specific components of the airport system such as the airfield, surrounding airspace, terminal area facilities, surface transportation, and general aviation facilities, are evaluated to determine if they are able to accommodate forecasted levels of demand without incurring significant delays or an unacceptable decrease in service levels. If deficiencies are identified, a determination of the approximate size and timing of new facilities is made. This section also presents a passenger terminal space program on the basis of passenger demand during the peak hour.

4.2 AIRFIELD

4.2.1 DEMAND/CAPACITY ANALYSIS

As noted in Section 2.0, Existing Conditions, the airfield at SPS is owned and operated by the U.S. Air Force. The City of Wichita Falls' ground lease includes only Runway 17/35. The three runways that comprise the Runway 15/33 system will continue to be operated and maintained by the U.S. Air Force. Therefore, because the City of Wichita Falls has no control over the remainder of the airfield, the following assessment of airfield capacity at SPS is for informational purposes only.

Methodologies for assessing airfield capacity are presented and described in Federal Aviation Administration (FAA) Advisory Circular 150/5060-5, *Airport Capacity and Delay*. The advisory circular describes how to measure an airfield's hourly capacity and its annual capacity, which is referred to as annual service volume.

Hourly capacity is defined as the maximum number of aircraft operations[1] that can be accommodated by the airfield system in one hour. It is used to assess the airfield's ability to accommodate peak hour aircraft operations.

Annual Service Volume (ASV) is defined as a reasonable estimate of an airport's annual capacity. As the number of annual operations increases and approaches the airport's ASV, the average delay incurred by each operation increases. When annual operations are equal to the ASV, average delay to each operation is approximately one to four minutes depending upon the mix of aircraft using the Airport. When the number of annual operations exceeds the ASV, moderate to severe congestion will occur. ASV is used to assess the adequacy of the airfield design, including the number and orientation of runways.

The capacity of the airfield at SPS was calculated on an hourly and annual basis using the "long-range planning" methodology presented in FAA Advisory Circular 150/5060-5. The long-range planning methodology is based upon the use of airfield diagrams that are representative of common airfield configurations.

[1] An aircraft operation consists of a landing or a takeoff.

An airfield diagram with three parallel runways was used for this analysis. While the SPS airfield has a fourth runway, the crosswind configuration of Runway 17/35 does not add significant capacity in the manner it is presently used. Therefore, the three-runway airfield diagram with closely spaced parallel runways is representative of the airfield at SPS.

The hourly capacity value for such an airfield is approximately 295 operations under Visual Flight Rule (VFR) conditions and 62 operations under Instrument Flight Rule (IFR) conditions. These values are for typical civilian aircraft operations. Actual values for military operations may differ from these values. Hourly operations at SPS are not known, but consist of T-38 touch-and-go's on Runway 15R/33L and T-6 touch-and-go's on Runway 15L/33R that vary over time with mission and training levels.

Hourly traffic volumes for civilian aircraft operations at SPS are very low (i.e., less than 10 operations). No significant delay attributed to commercial operations or general aviation activity has been observed. Civilian aircraft operations are sequenced in with the military operations and occur on Runway 15C/33C and on Runway 17/35. The airfield's hourly capacity does not and will not constrain civilian aircraft operations.

The ASV for three closely-spaced parallel runways is approximately 385,000. According to aircraft operation counts provided by the U.S. Air Force, the number of aircraft operations at SPS during 2008 was estimated at 323,000. Thus, the existing airfield annual capacity exceeds the annual demand. Military and civilian operations are anticipated to remain essentially flat into the future. Thus, no shortfall of airfield capacity is anticipated and no airfield capacity projects are required.

4.2.2.3 Delay Analysis

Delay is defined as the difference between constrained and unconstrained operating time or as the difference between the actual time required for an aircraft to perform an operation, either an arrival or a departure, and the time required for the same operation, assuming no interaction with other aircraft. On the basis of visual observations and consultations with airport users, very little delay to civilian aircraft operations occurs at SPS.

Civilian arrival delays primarily occur after landing and are associated with obtaining clearance to cross Runway 15R/33L when arriving on Runway 15C/33C and taxiing to the passenger terminal. Civilian departure delays are primarily related to sequencing departures with local military operations. These delays are typically short and do not significantly impede civilian aircraft operations.

4.2.3 FACILITY REQUIREMENTS

4.2.3.1 Design Criteria

To properly and consistently plan future airfield facilities, design criteria must be identified and applied. Airport design criteria are specified by the airport reference code that consists of two components. The first component is the Aircraft Approach Category. This component is related to the approach speed of aircraft and provides information on the operational capabilities of aircraft using the Airport. The second component is the Airplane Design Group. This component is related to the wingspan of the aircraft and provides information regarding the physical characteristics of aircraft using the Airport. **Table 4-1** provides a listing of the approach categories and design groups.

TABLE 4-1 AIRPORT DESIGN CRITERIA	
Aircraft Approach Category	
Category	**Approach Speed**
A	Less the 91 Knots
B	91 to 120 Knots
C	121 to 140 Knots
D	141 to 165 Knots
E	166 Knots or Greater
Airplane Design Group	
Group	**Wing Span**
I	Up to 48 Feet
II	49 to 78 Feet
III	79 to 117 Feet
IV	118 to 170 Feet
V	171 to 213 Feet
VI	214 Feet or Greater

Source: FAA Advisory Circular 150/5300-13, *Airport Design*, September 29,1989.

Aircraft Approach Category

A review of the civilian aircraft presently using, and forecasted to use, SPS reveals the aircraft in Approach Category C (i.e., approach speed of 121 knots or more but less than 141 knots) regularly use the Airport. This includes the EMB-145 and certain business jets, as well as aircraft that are typically used for charter operations at the Airport such as the MD-80 and B-737. Therefore, Approach Category C will be used to plan future airfield facilities leased by the City of Wichita Falls, which include Runway 17/35, Taxiway C, and the Municipal Apron.

Airplane Design Group

The ATR-72 is anticipated to be the largest civilian aircraft, in terms of wingspan, to regularly use SPS in the immediate future.[2] This aircraft has a wingspan of approximately 89 feet, which places it in Design Group III (i.e., a wingspan of 79 feet up to but not including 117 feet). Design Group III also includes larger aircraft such as the MD-80 (wingspan of 108 feet) and the B-737 (wingspan of 113 feet) that provide charter service at SPS. SPS also accommodates numerous air carrier aircraft in Design Group III that are diverted from Dallas/Fort Worth International Airport (DFW) due to poor weather. These aircraft also require facilities that are designed to Group III standards. Finally, it is likely that some type of 70-seat regional jet or advanced turbo-prop aircraft may serve SPS at some point in the future. These types of aircraft are also likely to be Design Group III aircraft. Therefore, future facilities associated with Runway 17/35, Taxiway C, and portions of the Municipal Apron will be designed to meet Design Group III standards.

Airport Reference Code

The airport reference code is determined by combining the Aircraft Approach Category letter with the Airplane Design Group number. Consequently, the airport reference code for SPS is C-III, for the facilities leased by the City of Wichita Falls. Other portions of Sheppard Air Force Base (AFB) that are controlled by the U.S. Air Force, are designed to military criteria, not FAA design standards. However, the military facilities on Sheppard AFB are generally designed to accommodate large, high-performance jet aircraft and are suitable for the civilian aircraft that use the facility.

4.2.3.2 Runway Safety Areas

Runway safety areas (RSA) are defined by the FAA as "surfaces surrounding a runway that are prepared or suitable for reducing the risk of damage to airplanes in the event of an undershoot, overshoot, or excursion from the runway." RSAs consist of a relatively-flat graded area that is free of objects and vegetation that could damage aircraft. According to FAA guidance, the RSA should be capable, under dry conditions, of supporting aircraft rescue and fire fighting (ARFF) equipment, and the occasional passage of aircraft without causing structural damage to the aircraft.

FAA dimensional standards for RSAs on runways serving aircraft in airport reference code C-III is a width of 500 feet and a length of 1,000 feet beyond the end of pavement. Although the City of Wichita Falls leases Runway 17/35 from the U.S. Air Force, it does not lease or control the associated RSA. However, the RSA associated with Runway 17/35 complies with FAA dimensional standards.

4.2.3.3 Runway Object Free Area

In addition to the RSA, an object free area (OFA) is also defined around runways in order to enhance the safety of aircraft operations. The FAA defines OFAs as an area cleared of all objects except those that are related to navigational aids and aircraft ground maneuvering. However, unlike the RSA, there is no physical component to the OFA. Thus, there is no requirement to support an aircraft or emergency response vehicles.

The OFA dimensions for runways serving aircraft in approach categories C-III (i.e., Runway 17/35) is a width of 800 feet and a length that extends 1,000 feet beyond the runway end. The OFA associated with Runway 17/35 complies with the FAA design standard.

4.2.3.4 Runway Separation Standards

Separation standards indicate the distance that various facilities such as taxiways, aprons, and other operational areas should be located from runways. These standards ensure that aircraft can safely operate on both areas simultaneously. These standards also ensure that no part of an aircraft on a taxiway penetrates the RSA or obstacle free zone.

The runway centerline to taxiway centerline separation standard for a C-III runway is 400 feet. A review of the parallel taxiway system associated with Runway 17/35 (i.e., Taxiway A) reveals that it has a separation of 1,025 feet and therefore, exceeds FAA design standards.

4.2.3.5 Number of Runways

The number of runways required at an airport depends upon factors such as wind coverage and capacity requirements. Wind coverage indicates the percentage of time that crosswind components are below an acceptable velocity. The FAA recommends an airport provide wind coverage of at least 95 percent. This means the Airport is able to accommodate aircraft operations within their limits of crosswind performance 95 percent of the time. If an airport does not provide the recommended wind coverage, an additional crosswind runway(s) should be considered.

[2] The FAA defines regular use as a minimum of 500 operations by a single type of aircraft.

A review of wind coverage calculations previously presented in Table 2-5 indicates the airfield's four-runway system provides 95.36 percent wind coverage using a 10.5-knot crosswind component during all-weather conditions. Higher wind coverages are achieved with higher crosswind components. Thus, on the basis of wind coverage, the existing airfield is adequate.

In addition to wind coverage, the required number of runways depends upon capacity requirements. The results of the demand/capacity analysis indicate the existing runway system will provide adequate airfield capacity on an hourly and annual basis throughout the study period. Therefore, based on both wind coverage and capacity requirements, the existing runway system will be adequate to serve the future needs of the Airport.

4.2.3.6 Runway Length

The two runways primarily used by civilian aircraft operations at SPS are Runway 17/35, which has a length of 7,021 feet and Runway 15C/33C, which has a length of 10,003 feet. The length of Runway 17/35 is sufficient to accommodate all operations by turbo-prop and regional jet aircraft operations to DFW. The length of Runway 15C/33C is sufficient to accommodate air carrier charter operations to the Las Vegas area and would also be sufficient to accommodate charter operations to other destinations in the continental United States. Furthermore, although not used as frequently for civilian aircraft operations, Runway 15R/33L has a length of 13,101 feet. Consequently, SPS has the ability to handle nearly any conceivable aircraft operational need. Thus, the existing runway length of the airfield system is adequate to meet all forecasted demand throughout the study period. No runway extensions are needed to accommodate civilian operations at SPS.

4.2.3.7 Runway Width

Runway width requirements are determined by airplane Design Group standards. The FAA standard for runways serving aircraft in Design Group III is 100 feet. However, the FAA standard for runways serving aircraft in Design Group III that have maximum takeoff weights greater than 150,000 pounds (such as some variants of the B-737) is 150 feet. Runway 17/35 has a width of 150 feet. All other runways at SPS have widths of 150 feet or more. These widths meet or exceed FAA standards and are adequate to serve all aircraft projected to use SPS on a regular basis throughout the study period.

4.2.3.8 Runway Strength

Pavement strength requirements are related to three primary factors: 1) the weight of aircraft anticipated to use the Airport, 2) the landing gear type and geometry, and 3) the volume of aircraft operations. According to the airport's FAA Form 5010 Airport Master Record, Runway 17/35 has a pavement strength of 20,000 pounds single-wheel loading, 45,000 pounds dual-wheel loading, and 80,000 pounds dual tandem loading. This strength is sufficient to accommodate light aircraft and some business jets, but is insufficient to accommodate scheduled air carrier aircraft currently using SPS such as the ATR-72 and the EMB-145. The current strength is grossly insufficient to accommodate the larger aircraft, such as the B-737 or the MD-80, that are occasionally diverted to SPS from DFW for weather related reasons.

The City of Wichita Falls has initiated a multi-year project to reconstruct the Runway 17/35 pavement. The project is currently under design and will upgrade the pavement strength to accommodate the currently scheduled air carrier traffic and occasional usage by larger aircraft. The project will also resolve a violation of FAA line-of-sight criteria by removing a high-point in the pavement that blocks visibility to runway ends.

4.2.3.9 Runway Pavement Markings

Runway 17/35 is currently marked as a non-precision instrument runway. There are no instrument approach procedures to Runway 17/35; however, the runway could be utilized under instrument conditions by aircraft executing an instrument approach to another runway and then making a circling approach to Runway 17/35.

The existing runway threshold markings do not meet current FAA standards. As of January 1, 2008, all threshold markings must meet the requirements of Configuration B contained in FAA Advisory Circular 150/5340-1J, which requires 12 - 5.75' wide by 150' long stripes arranged symmetrically about the runway centerline. The existing threshold markings appear to comply with Configuration A, which allows 8 12' wide by 150' long stripes, and is no longer acceptable. In addition, all of the existing runway markings are in poor condition due to age and deterioration of the underlying pavement.

All pavement markings on Runway 17-35 will be replaced when the runway is reconstructed as previously described. The new runway markings will be applied in compliance with Configuration B, for a non-precision instrument runway, using FAA approved materials and methods.

4.2.3.10 Taxiways

Taxiways accommodate the movement of aircraft from parking aprons to the runways and vice versa. It is desirable to have a parallel taxiway and several exit taxiways associated with each runway to provide for the efficient movement of aircraft. The taxiway system from the municipal apron to the airfield system consists of Taxiway C, which connects directly to Runway 17/35 and Taxiway D. The only parallel taxiways at SPS are Taxiway D on the west side of Runway 15R/33L and Taxiway A on the west side of Runway 17/35.

As noted in Section 2.0, Existing Conditions, Taxiway A is presently closed south of Taxiway B due to poor pavement conditions. Rehabilitation of Taxiway A by the U.S. Air Force would allow civilian aircraft operations to remain off of Taxiway D, which is heavily used by military aircraft. This improvement would improve the overall efficiency of the taxiway system.

Taxiway Width

FAA design standards specify a width of 50 feet for taxiways serving aircraft in Design Group III. However, in cases where the taxiway also must accommodate aircraft that have a long wheelbase (i.e., a distance from the nose gear to the main gear of more than 60 feet) FAA design standards recommend that the taxiway width be increased to 60 feet to account for the fact that the aircraft's main gear will track farther from centerline during turns. The wider taxiway width accounts for this fact and maintains a proper safety margin between the outside of the main gear and the edge of pavement. The MD-80 aircraft that occasionally use SPS have a wheel base that exceeds 60 feet in length. Therefore, taxiways that are used by these aircraft should have a width of 60 feet.

Taxiway C has a width of 50 feet. It is recommended that the City of Wichita Falls consider widening the taxiway to a width of 60 feet to better accommodate aircraft with longer wheel bases. While the overall number of operations by these aircraft is low, the potential for an aircraft to exit the pavement, become disabled, and block aircraft access to the terminal exists. Given the importance of this issue a wider taxiway width should be considered.

Taxiway Strength

Taxiway C was constructed in the 1950s and consists of 10 inches of Portland Cement Concrete Pavement on an aggregate base course. The taxiway was rehabilitated in late 2007. The rehabilitation consisted of joint sealing, spall repair, and panel replacement. The taxiway pavement strength is sufficient to accommodate general aviation and commuter aircraft that regularly use the Airport, but is insufficient to accommodate larger Design Group III commercial aircraft that occasionally use the Airport.

It is recommended that the City of Wichita Falls strengthen Taxiway C to accommodate all aircraft using the taxiway. Even occasional usage by aircraft exceeding the pavement strength could greatly shorten the existing taxiway's pavement life. It is FAA policy to design airfield pavements for a 20-year life, utilizing the aircraft fleet mix and annual departures forecast for the Airport.

4.2.3.11 Holding Bays

There are holding bays on Taxiway C and Taxiway E on the west side of Runway 17/35 but, they are of no value to civilian aircraft operations that taxi to Runway 17/35 from the east side of the runway. Since the total number of civilian aircraft operations at SPS is fairly low there does not appear to be a need for holding bays on the east side of Runway 17/35. Therefore, no additional holding bays are recommended.

4.2.3.12 Navigational Aids

The Airport currently has an Instrument Landing System (ILS) on Runway 15C and Runway 33L. These navigational aids provide the ability to accommodate civilian aircraft operations in nearly all weather conditions. No additional navigational aids are needed to support civilian aircraft operations.

4.2.3.13 Airfield Lighting

Approach Lighting

Three types of approach lighting are currently installed at SPS. A Medium Intensity Approach Lighting System with Runway Alignment Indicator Lights (MALSR) is installed on both ends of Runway 13R/33L, an Approach Lighting System with Sequenced Flashing Lights (ALSF-1) is located on both ends of Runway 15C/33C and a Lead-in Light System is located on the approach to Runway 17.

The MALSR and ALSF-1 approach lighting systems are consistent with precision instrument approaches and provide the Airport with the ability to accommodate properly equipped aircraft to land during poor weather conditions. The purpose of the lead-in lighting system on Runway 17 is to provide visual guidance to pilots and assist them in remaining clear of operations on the Runway 15/33 system. These approach lighting system are adequate to meet the needs of civilian aircraft operations.

Runway End Identification Lights (REILS) are installed on Runway 35. This lighting system provides rapid identification of this runway end to pilots during nighttime or periods of low visibility. No additional approach lighting systems will be needed throughout the study period.

Runway Edge Lighting

Runway edge lights are used to outline the edges of runways during periods of darkness or low visibility conditions. All four runways at SPS are equipped with High Intensity Runway Lights (HIRL). These runway lighting systems are appropriate for runways with precision and non-precision approaches, respectively and exceed the requirement for runways with visual approaches.

Part 139 Certification inspections have identified excessive (greater than 3 inches) vertical edge drops adjacent to the existing high-intensity edge light manholes on Runway 17-35. In addition, there have been reports of maintenance problems with the Runway 17-35 HIRL circuit.

Approximately half of the existing Runway 17-35 edge lights will be replaced when the runway is reconstructed as previously described. The north half of the runway will be lowered up to three feet to provide compliance with FAA line-of-sight criteria. The edge lights adjacent to the lowered pavement section will be removed and replaced at a lowered elevation. Grading issues around the runway light manholes will be resolved on the entire length of the runway at the same time. It is anticipated that the runway edge light circuit will be completely replaced as a part of the same project.

Taxiway Edge Lighting

The existing taxiway system has medium intensity taxiway edge lighting. This lighting is sufficient to serve the needs of the taxiway system.

Apron Lighting

Apron lighting consists of apron edge lighting, similar to taxiway lighting, and high-mast flood lighting. Apron edge lighting is used to delineate the edge of pavements so that pilots do not inadvertently taxi aircraft off apron areas. High-mast flood lighting is used to provide sufficient lighting for the operation and servicing of aircraft in parking areas.

Consultation with airport management indicates that improved flood lighting is needed near the terminal and general aviation apron.

There is no apron edge lighting at the terminal apron other than at the entrance from Taxiway C. Additional apron edge lighting is not recommended as all airfield lighting is presently owned and maintained by the U.S. Air Force. Installation of additional apron edge lighting would be the city's responsibility and could be more economically achieved through improving flood lighting on the apron.

4.2.3.14 Airfield Perimeter Fencing/Gate Access

Existing fencing around SPS consists of chain-link at various heights that provide different levels of security. The majority of the fencing is owned by the U.S. Air Force. However, some fencing in the terminal area is owned and maintained by the City of Wichita Falls. It is recommended that standard chain-link fencing with barbed wire tops be installed around secure portions of the terminal area to provide a consistent level of security from intrusions.

Access to the secure portion of the terminal area is provided via gates at the west end of the passenger terminal and at the east end of Hangar 2.5. The gate at the west end of the passenger terminal is manually operated. The gate at the east end of Hangar 2.5 is automated and accessed using a keypad system. The location of the automated gate will be re-examined during the development of terminal area concepts to determine whether an alternate location may reduce the number of vehicles having to use this gate thereby reducing the number of vehicles entering the secure portion of the terminal area. Access gates and their control systems will be evaluated to ensure that they provide a sufficient level of security.

4.3 AIRSPACE/AIR TRAFFIC CONTROL

4.3.1 DEMAND/CAPACITY ANALYSIS

Airspace in the vicinity of SPS is relatively free of constraints that would adversely affect airfield capacity. Special use airspace in the vicinity of the Airport includes an Alert Area and Military Operations Areas as described in Section 2.0, Existing Conditions. These areas do not restrict aircraft operations to or from SPS.

Numerous tall towers are located southwest of the Airport including towers that exceed 2,000 feet. However, these towers are located far enough away from the Airport and are not a significant constraint on aircraft operations.

4.3.2 FACILITY REQUIREMENTS

There are no additional facility requirements for airspace/air traffic control (ATC) at SPS. ATC services will continue to be provided by the U.S. Air Force. The U.S. Air Force's control tower is a modern facility that provides all required services.

4.4 TERMINAL AREA

The primary areas analyzed in this section include the passenger terminal building and terminal apron area, while vehicle access and parking requirements are considered in Section 4.5. The capacities of these terminal components were evaluated in relation to forecasted peak hour demand to determine the overall adequacies of each component of the terminal area. Deficiencies in capacity of the terminal area were identified to determine future needs.

4.4.1 PASSENGER TERMINAL

4.4.1.1 Demand/Capacity Analysis

The capacity of terminal area facilities is typically calculated and compared to the forecasted levels of passenger demand. However, peak hour demands at SPS consist of more than just the scheduled peaks of scheduled passenger service. Peak hour demand at SPS consists of charter passenger service with an air carrier size aircraft, such as a B-737, overlapping with scheduled passenger services with a regional jet or large turbo-prop aircraft, such as the EMB-145 or the ATR-72.

Therefore, the passenger terminal space requirements at SPS were calculated using a 150-seat charter operation occurring simultaneously with a 70-seat aircraft such as an ATR-72. To account for the potential for another carrier to serve the Airport at some point in the future, the additional space requirements associated with accommodating another 50-seat aircraft were also considered and calculated.

Another factor considered when assessing demand for terminal space at SPS was the fact that the Airport receives a substantial number of aircraft diversions from DFW when adverse weather conditions occur in Dallas. Several aircraft can be diverted to SPS simultaneously. Pending Federal legislation, regarding passenger rights, may require that airlines allow passengers on long-delayed flights to disembark their aircraft. If this type of legislation becomes a law, it will further increase the passenger handling needs of the terminal. Thus, allowances were made in seating areas to accommodate significant numbers of passengers.

The future demand for space in the passenger terminal was calculated using a bottom up methodology. This method consists of calculating the amount of space required for each terminal function such as airline space, public space, baggage claim, etc. The amount of space required for each of these functions is then added together to determine the total amount of terminal space required. This approach requires that planning factors or dimensions be specified for each terminal function. The amount of space and the planning factors used are presented in Appendix A – Passenger Terminal Space Program.

The terminal program defines the amount of floor space required for the passenger terminal to serve existing and future peak hour passengers. The program is based on industry standards described in the FAA Advisory Circular 150/5360-13, "Planning and Design Guidelines for Airport Terminal Facilities," and on the experience of developing terminal programs at other airports of similar size. The program will be used as a basis for developing terminal concepts presented in Section 5.0, Terminal Concepts.

Table 4-2 presents a summary of the terminal program. Floor areas have been grouped on the basis of function. A brief discussion of each functional area follows.

Airline Ticket Counter and Lobby

The space program accounts for two carriers operating in the terminal. American Eagle is currently the sole scheduled carrier operating at the Airport. Operations by charter airlines are conducted next to the American Eagle ticket counter. The space program accounts for the fact that an additional carrier may need terminal space in the future.

TABLE 4-2
TERMINAL SPACE PROGRAM

	2009 Existing (sq. ft.)	2009 Demand (sq. ft.)	Additional Demand with 50-Seat Regional Jet (sq. ft.)
Ticketing/Check-In	3,577	6,020	0
Passenger Security Screening	2,033	2,468	150
Departure Hold Room	779	4,520	715
Baggage Claim	1,198	4,860	530
Car Rental	364	540	0
Meeters/Greeters Hall	2,159	3,820	0
Concessions	678	2,200	0
Airport Administration	3,158	3,240	0
Support Areas	554	0	0
Subtotal	**14,500**	**27,668**	**1,395**
Circulation	2,987	5,494	279
Subtotal	**17,487**	**33,162**	**1,674**
Mechanical/Electrical/Commercial	0	2,637	0
Total Area	**17,487**	**35,799**	**1,674**

Source: URS Corporation, 2009.

The program is based on a ticket counter length of 33 feet and a depth of 10 feet, which includes 3 feet for the ticket counter, 4 feet for the agent work zone, and 3 feet for the baggage conveyor. An additional 35 feet of depth is provided for airline office space. On the passenger side of the counter, the space program provides 10 feet of queuing space and 15 feet for general circulation in front of the passenger queue area. The amount of space allocated for airline ticket counters and offices is typically one of the largest components of the terminal program.

Public Waiting Area

The space program provides a seating area for meeters/greeters accompanying departing passengers or waiting for arriving passengers. This area was sized to accommodate 150 people including passengers and well-wishers. An allowance of 10 square feet of waiting area per person is provided.

Passenger Security Screening

Space for security screening is based on accommodating a maximum surge of 20 percent of peak hour passengers at one time. This surge factor accounts for passengers arriving at the checkpoint in surges rather than at a uniform rate. A screening rate of 200 passengers per checkpoint per hour is assumed, based on information provided by the Transportation Security Administration (TSA).

Space is allocated for the checkpoint based on an allowance of 750 square feet for the walk-through metal detector, carry-on baggage x-ray, conveyor belts, and TSA work area. This allowance accommodates the TSA's recommended layout of equipment. In addition, queuing space is provided for the 20-percent surge of passengers at a rate of 15 square feet per person. A private search room and TSA management, training, and employee offices are sized according to TSA planning standards. One metal-detector/x-ray couplet will provide sufficient screening capacity at SPS throughout the forecast planning period.

Checked Baggage Screening

The space allocation for checked baggage screening is based on accommodating an Explosives Detection System (EDS) device and an Explosive Trace Detection (ETD) device. The EDS is the TSA's preferred primary screening device. It can be used either as a stand-alone device where screening personnel manually load each piece of baggage onto its feed conveyor, or it can be installed in an automated, in-line configuration where airlines' outbound baggage conveyors feed baggage directly. As stand-alone equipment, the newer EDS models have a processing rate of 180 bags per hour; in the in-line configuration, the processing rate increases to over 400 bags per hour according to TSA data. Throughout the planning period, the requirement for checked baggage screening can be satisfied with one EDS, in either configuration.

The ETD is a smaller device that detects explosives residue and is manually operated by TSA personnel. Installed alongside an EDS, the ETD may be used as backup in the event of an EDS breakdown, or it may also be used for secondary screening for baggage that triggers an alarm in the EDS. The ETD workstation has a processing rate of approximately 36 bags per hour according to TSA data. A total allowance of 1,500 square feet is made for both devices, operator work areas, and for maintenance and inspection clearances.

Baggage Claim

The area for baggage claim is calculated to accommodate a flat plate claim device with 120 feet of claiming frontage and 40 feet of offloading frontage. This device is sized for 220 arriving passengers, assuming a baggage ratio of 1.3 bags per passenger. An active claiming and lobby area 12-feet deep is provided continuously along the claim device. Two storage rooms at 40 square feet each are provided for unclaimed bags and a hotel advertising board is provided at 100 square feet, bringing the total baggage claim area to 3,060 square feet.

A 50-foot wide inbound baggage area includes 3 feet of depth for the offload conveyor, 3 feet for the offloading work area, and two-12-foot wide lanes for a total depth of 30 feet, bringing the total inbound baggage area to 1,800 square feet.

Greeters Area

A greeters area is provided for 150 standees at 10 square feet per person and seating for an additional 50. Space allocations were also made for a meditation room, an information and tourism center, and a community cultural or art display area, with the total greeters area being 3,000 square feet.

Rental Car Concessions

Concession space for three rental car operators is provided, each with an 8-foot long service counter and a 100-square foot office. Total area for this concession is 540 square feet.

Departure Hold Room

A single departure hold room is designed to accommodate 220 peak hour departing passengers, with seating for all, at 15 square feet per seat. The hold room includes two check-in podiums with queuing area at 200 square feet each, and standee-circulation space and a gate access corridor calculated at 10-percent of the total hold room area. The total hold room area is 4,070 square feet.

Restrooms

Public restrooms are one of the key deficiencies in the existing terminal. They are absent from the departures hold room and those in the meeter/greeter area do not fully comply with Americans with Disabilities Act of 1990 (ADA) design guidelines for accessibility. However, compliance with ADA requirements should be improved during 2010 as a result of planned renovations.

The Terminal Space Program includes public restrooms in the meeter/greeter area with a family assistance restroom provided alongside. Restrooms are also provided in the departures hold room. A janitor closet with a floor sink and limited paper storage is included in the program area for each restroom location.

Airport Management/Employee

The total program area for airport management is similar to that in the existing terminal but is broken down into offices and workspace for management personnel. This area includes a conference room for 25 people, an employee break room, areas for document filing and storage, and restrooms. Space is included for a Law Enforcement Officer in conjunction with the passenger screening checkpoint.

Concessions

Concession space includes gift shops, food and beverage services, a game room with snack vending machines, and office space for lease to the United Service Organizations (USO) (although not technically a concession). A small snack vending area is programmed for the departures hold room, but all other concession space is intended for placement near the non-sterile greeters area. Excluding the USO space, the total concessions area in the Terminal Space Program is 1.6 times greater than that in the existing terminal.

Maintenance/Janitorial

Space for airport maintenance equipment and supplies is programmed at 1,000 square feet. This is less than half the area than the existing terminal provides for this function but is deemed adequate by airport management. As noted above, additional paper supplies storage is provided in each janitor closet adjacent the restrooms.

General Circulation

An allowance of 5,524 square feet is made for circulation, based on a calculation of 20 percent of the total terminal area.

Mechanical/Electrical

An allowance of 2,651 square feet is made for mechanical, electrical, and communications equipment, based on a calculation of 8 percent of the total terminal area, including general circulation.

Structural

An allowance of 1,790 square feet is made for the building structure, based on a calculation of 5 percent of the gross program area.

4.4.1.2 Facility Requirements

The airport terminal space program estimates a space requirement of approximately 37,500 square feet for new terminal facilities to serve passenger and airline needs throughout the study period. This compares to existing space of approximately 17,500 square feet in the existing terminal. Thus, an additional 20,000 square feet of passenger terminal space are needed to meet peak hour passengers demands now and in the future.

4.4.2 TERMINAL APRON

The terminal apron for parking scheduled and charter passenger flights adjoins the passenger terminal. It has a width of 360 feet and a depth of 470 feet (18,800 square yards). The apron's width is denoted by a yellow stripe that extends across the apron pavement from the east corner of the passenger terminal to the west corner of Hanger 7. The apron on the east side of the yellow stripe is reserved for use by general aviation aircraft. However, during diversions of flight from DFW the entire apron (terminal and general aviation) is sometimes used for temporary parking of commercial aircraft.

The terminal apron provides sufficient space for parking a charter aircraft operation and a commuter aircraft such as an ATR-72 or regional jet. However, the layout of the apron is not optimal due to the location of the entrance and exits to Taxiway C, as well as the fact that the taxilanes to and from those exits traverse across the apron, thereby, reducing the amount of space that can effectively be used for aircraft parking.

As previously noted, SPS can simultaneously receive several diversion of air carrier aircraft from DFW. The terminal apron is not sufficiently sized to accommodate these aircraft.

An expansion of the existing apron to provide sufficient space for the aircraft providing scheduled passenger service and at least two charter operations is recommended. Section 5.0, Terminal Concepts, will examine options for expanding the existing ramp to provide this level of capability.

Apron Strength

The Terminal Apron consists of a 10-inch thick PCC pavement. Like Taxiway C, the portions of the Terminal Apron that are utilized by large Design Group III aircraft should be strengthened to accommodate the forecast aircraft fleet mix and be designed for a 20-year life. Pavement rehabilitation, consisting of joint sealing, spall repairs, and panel replacements should be completed.

Portions of the apron pavement were rehabilitated as a part of the Taxiway C project, previously discussed. The rehabilitation included joint sealing, spall repair, and panel replacement. Funding was insufficient to rehabilitate all areas that were in need of repair. Therefore, an additional apron rehabilitation project is recommended to bring the entire apron up to good condition.

Where apron pavement is subjected to general aviation aircraft wheel loadings only, no additional strengthening will be required. In general, a 30,000-pound Single Wheel Load (SWL) is used for design. The existing concrete pavement is sufficient for this wheel loading. However, the asphalt pavement surrounding the T-Hangar building is exhibiting signs of aging, such as oxidization, raveling, and cracking. This pavement should be evaluated for the most effective rehabilitation strategy, or for possible replacement.

4.5 SURFACE TRANSPORTATION

4.5.1 INTRODUCTION

The purpose of this section is to evaluate existing and future vehicle demand and identify any improvement needs for the surface transportation system supporting SPS. This analysis includes the airport circulation roadway, airport parking, and the terminal curb frontage.

4.5.2 AIRPORT ROADWAYS

The passenger terminal is accessed via a two-lane roadway (Armstrong Drive) that connects the Airport to Airport Drive (FM 890) and provides access to the public and rental car parking, areas, as well as general aviation facilities.

The performance of roads is characterized on the basis of levels of service (LOS), which are given letter designations from "A" to "F." LOS "A" represents the best operating conditions and LOS "F" the worst. Visual observations and traffic counts indicate the access road to passenger terminal operates at a LOS A and will continue to operate at LOS A throughout the study period on the basis of the forecasts presented in Section 3.0, Aviation Forecasts.

Three days of traffic counts were collected by City of Wichita Falls personnel on Armstrong Drive south of the Air Force's Medical Readiness (Med-Red) facility. This location receives traffic from vehicles going to the Airport, as well as vehicles going to the Med-Red facility.

These traffic counts provided three complete days of 24 hour traffic counts for the days of June 12 through June 15, 2009. **Table 4-3** presents the results of the traffic counts for these three days in the Northbound and Southbound directions. **Figure 4-1** presents a graphical depiction of hourly traffic counts for Friday, June 12, 2009.

TABLE 4-3
ARMSTRONG DRIVE DAILY TRAFFIC COUNTS (JUNE 12-15, 2009)

	Armstrong Northbound (Inbound)			Armstrong Southbound (Outbound)		
	Day			Day		
	Friday	Saturday	Sunday	Friday	Saturday	Sunday
Hour	**12-Jun-09**	**13-Jun-09**	**14-Jun-09**	**12-Jun-09**	**13-Jun-09**	**14-Jun-09**
midnight to 1 am	1	0	0	1	0	0
1 to 2 am	1	0	0	2	0	0
2 to 3 am	2	0	0	1	0	1
3 to 4 am	4	1	0	0	0	0
4 to 5 am	23	21	8	9	10	0
5 to 6 am	35	32	22	14	15	8
6 to 7 am	16	8	1	22	10	1
7 to 8 am	39	7	9	10	5	3
8 to 9 am	35	23	9	26	14	5
9 to 10 am	60	55	57	35	43	16
10 to 11 am	31	21	15	42	25	38
11 to noon	36	21	24	57	20	41
noon to 1 pm	34	15	21	35	18	12
1 to 2 pm	44	44	41	36	31	26
2 to 3 pm	36	30	19	34	32	24
3 to 4 pm	46	22	28	41	59	48
4 to 5 pm	55	7	28	63	13	18
5 to 6 pm	25	5	29	59	5	55
6 to 7 pm	18	3	16	27	2	17
7 to 8 pm	19	7	17	19	7	12
8 to 9 pm	47	4	20	38	3	8
9 to 10 pm	18	7	9	55	4	33
10 to 11 pm	8	3	3	24	15	6
11 to midnight	2	0	0	3	0	0

Source: URS Corporation, 2009.

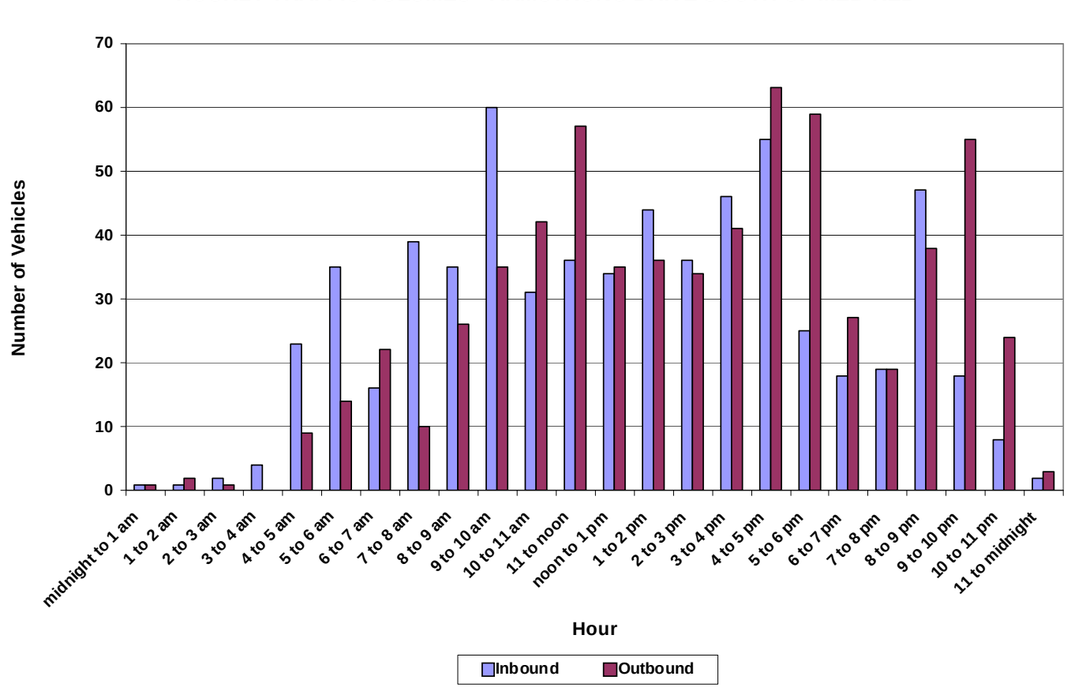
The results of the traffic counts reveal that the peak hour is typically in the range of 60 to 65 vehicles inbound and outbound for a total of over 120 vehicles during the peak hour. Higher peak hour traffic volumes are experienced when the Airport has a charter flight. However, the roadways traffic volumes are far lower than the roadway's capacity. Therefore, no capacity improvements to Armstrong Drive are required.

4.5.3 AIRPORT PARKING

An inventory of parking facilities was conducted to determine the number of parking spaces available for public, employee, and rental car use. **Table 4-4** summarizes the existing parking facilities.

Consultation with airport management revealed that the public parking lot typically operates at 60 percent of capacity, although it is full during overlapping charter operations and during the Christmas holiday period. A vehicle occupancy count conducted on June 3, 2009 obtained an occupancy value of 66 percent. Another vehicle occupancy count from aerial photography taken in 2007 revealed an occupancy value of 68 percent. Thus, there seems to be a fair degree of stability in vehicle occupancy levels during regularly scheduled operations.

FIGURE 4-1
HOURLY TRAFFIC VOLUMES - ARMSTRONG DRIVE SOUTH OF MED-RED



Note: Traffic volumes and peaking characteristics are based on data collected Friday, June 12, 2009.

TABLE 4-4
PARKING FACILITIES

Lot	Spaces
Public Parking	187
Short-Term	8
Employee/Overflow Parking	76
Rental Car Ready/Return	8
Rental Car Storage	40
Total	319

Source: URS Corporation, 2009.
Note: The count of 187 spaces in the public lot is approximate because a portion of the last row is used for vehicle egress from the parking lot. There are four disabled parking spaces in the public lot.

Vehicles use the employee/overflow parking lot during periods when the public parking lot is full. While the employee/overflow parking lot has not exceeded capacity, 40 spaces in the lot are reserved for rental cars. Thus, total capacity for public parking spaces is exceeded at peak periods. Peak parking occupancy rate should not typically exceed 85 to 90 percent in order to avoid excessive vehicular circulation by motorists searching for an empty space.

Short-term metered parking across from the terminal entrance is constantly full during flight departures and arrivals and requires expansion to meet demand. Actual demand for short-term parking is likely in the range of 15 to 20 parking spaces based upon visual observations.

Consultation with airport tenants and airport management revealed that the employee/overflow parking lot is presently adequate to meet demand. No expansion of this lot is necessary on the basis of employees or rental car requirements through the study period. Consultation with rental car operators revealed that the ready and return parking spaces operate within capacity and that additional ready/return spaces are not needed to meet future levels of demand.

Based on the existing demand, it is evident the existing public parking lot operates near or at capacity during peak travel periods, but has excess capacity during typical scheduled operations. **Table 4-5** lists the estimated parking needs for future years for public parking, as well as short-term parking. For design purposes, future parking requirements for public parking were calculated by applying the projected growth rate of passenger enplanements (i.e., 1 percent) to current level of peak period occupancy.

TABLE 4-5
PARKING REQUIREMENTS

Category	Projections By Period				
	2010	2015	2020	2025	2030
Public Spaces					
Existing Capacity	187	187	187	187	187
Average Demand	127	134	140	146	153
Peak Period Demand	234	246	258	269	281
Addt'l Spaces Required	47	59	71	82	94
Short –Term Parking					
Existing Capacity	8	8	8	8	8
Demand	15	20	20	25	25
Addt'l Spaces Required	7	12	12	17	17

Source: URS Corporation, 2009.

There are a variety of options for how additional parking demands can be accommodated. Options include incorporating short-term parking into public parking with an allowance for a free parking period (e.g., 30-minutes free parking), flexible use of multiple lots similar to what currently occurs, as well as construction of additional spaces to meet peak levels of demand. Options for additional parking will be investigated in Sections 5.0, Terminal Concepts and 6.0, Refinement of Preferred Terminal Concept.

4.5.4 TERMINAL CURBSIDE

The curb in front of the passenger terminal provides approximately 200 linear feet for passenger loading and unloading. Consultation with airport management and visual observations indicate the terminal curb is not typically full except during charter operations. This is partially due to the "No Parking" requirements at curbside and occasional enforcement by law enforcement personnel. Vehicles waiting for arriving passengers have been observed parked prior to and past the terminal curb, along the general aviation area and the rental car storage lot.

On the basis of current use patterns, the existing amount of terminal curb is sufficient to meet projected levels of demand by scheduled operations. However, consideration should be given to increasing the amount of terminal curb to better accommodate peak demand during charter operations. This is especially true since there are significant numbers of elderly passengers on the charter operations that need direct access to vehicles. In addition, airport management has indicated the need to provide a dedicated area for a FallsRide/Sheppard AFB shuttle area. Options for accommodating these specific needs and increasing overall terminal curb through additional length or multiple curbs will be examined in Section 5.0, Terminal Concepts.

4.6 SUPPORT FACILITIES

4.6.1 AIRCRAFT RESCUE AND FIREFIGHTING (ARFF)

The FAA has established specific requirements for ARFF equipment. These requirements are shown in **Table 4-6** and vary depending upon the frequency that aircraft of various sizes serve the Airport. As the table indicates, the requirements are stated in terms of "Indexes" that begin with the letter "A" for airports serving small aircraft and extend to Index "E" for airports serving large aircraft. Each Index letter defines a range for aircraft length. Index A is defined as aircraft that have a length of less than 90 feet. The longest index group with an average of 5 or more daily departures by air carrier aircraft is the Index required for the Airport.

As of 2009, there are no civilian commercial service aircraft having a length greater than 90 feet that average five or more daily departures at SPS. Thus, SPS only needs to meet Index A requirements. Regular operations (i.e., more than 500 annually) by aircraft in Index B may occur during the 20-year study period. This could include the CRJ-700 (length of 106'8") and/or the Q-400 turbo-prop (length of 107'9").

ARFF services at SPS are currently provided by the U.S. Air Force. Services provided by the U.S. Air Force exceed the vehicle, equipment, and personnel requirements of Index B as specified by Federal Aviation Regulation Part 139.315. Therefore, the existing ARFF facilities are sufficient to meet existing and future demands.

TABLE 4-6
ARFF EQUIPMENT REQUIREMENTS

Airport Index	Length[1] of Aircraft (Representative Aircraft)	Vehicles		Extinguishing Agents	
		Light-Weight	Self-Propelled	Dry Chemicals (Pounds)	Water (Gallon)
A	Under 90 (ATR-72)	1	0	500 Sodium or 450 Potassium	0 to 100
B	90 to 125 (CRJ-700)	1	1	**500 Sodium or Halon**	1,500
C	126 to 158 (MD-80)	1	2	500	3,000
D	159 to 199 (767)	1	2	500	4,000
E	Over 200 (747)	1	2	500	6,000

[1] Length of largest aircraft providing an average of five scheduled departures per day. If there is less than an average of five daily departures by aircraft in a particular index, then the next lower index applies.

4.6.2 AVIATION FUEL STORAGE FACILITIES

Table 4-7 presents historical annual fuel sales for Jet-A and AVGAS at SPS from 2005 through 2008.

TABLE 4-7
HISTORICAL FUEL SALES (GALLONS)

Year	Jet-A	AVGAS	Total Fuel
2005	424,445	37,854	462,299
2006	409,773	29,359	439,132
2007	526,765	29,741	556,506
2008	373,805	19,689	393,494

Source: SPS, 2009.

A review of monthly fuel sales for 2005 through 2008 indicates that peak month sales for Jet-A was as high as 15 percent of annual sales, but more typically is around 13 percent. The highest monthly value recorded for Jet-A sales was 66,281 gallons.

Monthly AVGAS sales have been as high as 18 percent of annual sales, but more typically are around 14 percent. The highest monthly value recorded for AVGAS sales was 6,654 gallons.

As noted in Section 2.0, Existing Conditions, the Airport has two 18,500-gallon tanks for Jet-A and one 10,000-gallon tank for AVGAS. Using the peak month Jet-A value listed above (66,281 gallons), a 16-day fuel supply is currently provided based on the 37,000-gallon capacity for Jet-A. With respect to AVGAS, a 45-day supply exists based on the existing 10,000-gallon capacity. These capacities are adequate to meet existing and future levels of demand.

4.6.3 AIRPORT MAINTENANCE

There are no maintenance facilities at SPS. Landscaping is performed by the City of Wichita Falls Parks Department. Vehicles and machinery for landscaping are stored and maintained at the Parks Department facilities. Likewise, roadway maintenance is performed by the City of Wichita Falls Street Department. Consultation with airport management indicates that there is no need for a maintenance facility at the Airport. Services will continue to be provided by various City departments.

4.6.4 RENTAL CAR SERVICING

Rental car servicing for Budget is currently done in a small metal shed located southeast of Hangar 5, adjacent to the aircraft apron. This facility is in good condition and adequately meets the needs of Budget Rental Car. However, this location requires that the rental vehicles and the employees servicing the vehicles proceed through a security gate to the secure portion of the aircraft apron. It is desirable to relocate or replace this facility in a non-secure area to avoid unnecessary access to secure the secure portion of the airfield.

Rental car servicing for Hertz is done in a small wash shed on property owned by Hertz adjacent to Armstrong Drive. The shed is in poor condition and needs replacement.

To resolve these issues, a consolidated on-site servicing facility could be considered for use by all rental car operators at the Airport. By constructing a common facility, the amount of space required and the cost to operators could be minimized. Options for the placement of such a facility will be examined in subsequent sections.

4.7 GENERAL AVIATION FACILITIES

The purpose of this evaluation is to determine the capacity of existing general aviation facilities and their ability to meet forecasted levels of demand during the planning period.

In this analysis, the following types of facilities were evaluated:

- Storage hangars
- Based aircraft apron
- Transient aircraft apron

Details of the analysis for each type of facility are provided in the following paragraphs.

4.7.1 STORAGE HANGARS

4.7.1.1 Demand/Capacity Analysis

The demand for storage hangars is dependent upon the number and types of aircraft expected to be based at the Airport, as well as local climatic conditions, airport security, owner preferences, and site specific factors. The percentage of based aircraft that are stored in hangars varies, but is usually greatest in regions that are subject to extreme weather conditions.

Demand for storage hangars is usually estimated by assuming that a certain percentage of aircraft owners desire hangar storage for their aircraft. Furthermore, it is assumed that a greater percentage of owners of high-performance aircraft desire hangar space as compared to owners of low performance aircraft. Actual demand for hangar space can vary significantly from the estimate because the estimates are based on assumptions.

The actual demand for hangar space at SPS is 100 percent. All based aircraft at the Airport are currently stored in hangars. No aircraft are tied-down on the apron ramp. As described in Section 2.0, Existing Conditions, Landmark Aviation currently has four open-bay hangars. Hangars 1, 2, 2.5, and 4 are used for aircraft storage, while Hangar 3 is primarily used for storage of itinerant aircraft. Excess storage capacity presently exists in Hangars 3 and 4. These open-bay hangars provide approximately 62,600 square feet of storage space. Excess storage capacity also exists in the 10 unit T-hangars, but two of these units are currently not used due to flooding problems.

It is anticipated that the majority of growth by general aviation aircraft in the Wichita Falls area will occur at Kickapoo Downtown Airport due to that airport's ease of use compared to SPS (i.e., lack of military operations). The future growth of based aircraft at SPS will likely be focused on larger, high-performance aircraft that are unable to use Kickapoo Downtown Airport due to its shorter runway length (4,450 feet) and/or lack of a precision instrument approach. These high-performance aircraft may include larger twin-engine turbo-props and jets.

Consequently, there does not presently appear to be demand for additional storage hangars. While the need for additional hangar space is not anticipated at SPS solely on the needs of existing based aircraft, future business development in the Wichita Falls area may create a demand for corporate hangar facilities. The demand for such facilities will depend on the amount of economic growth and business development in the City of Wichita Falls and surrounding region. While the future demand for corporate hangar facilities is not known, and cannot be predicted with any degree of accuracy, good planning would dictate that the master plan consider the potential for such facilities and identify suitable locations for corporate hangars if such demand materializes. This would enable SPS to efficiently respond to the demand for hangar parcels if and when it occurs subject to the approval by the Sheppard AFB installation commander.

4.7.1.2 Facility Requirements

The results of the demand/capacity analysis indicate that there is not currently demand for additional hangar facilities at SPS. Plans for the potential location of additional corporate hangars will be identified on the airport layout plans.

4.7.2 GENERAL AVIATION AIRCRAFT APRON

4.7.2.1 Demand/Capacity Analysis

Apron areas should be provided for based aircraft that are not stored in hangars and itinerant aircraft. No clear distinction is made between apron for based aircraft and itinerant aircraft at SPS. However, consultation with Fixed Base Operator (FBO) management revealed that itinerant aircraft are usually parked in front of the FBO lobby, while tie-downs for based aircraft is provided toward the north side of the general aviation apron where 14 tie-down spaces are marked on the pavement. Field inspection of these tie-downs reveals that some are located in areas that would be used for taxiing to Hangars 5 and 7 and would not likely be used for tie-down purposes. Nonetheless, consultation with FBO management indicates that the existing apron is sufficient to meet existing and projected demand for based and itinerant aircraft apron.

4.7.2.2 Facility Requirements

While additional apron is not needed to accommodate the needs of based or itinerant general aviation aircraft, the existing apron suffers from a number of problems including oxidization, raveling, and cracking. Drainage improvements are also required to alleviate flooding problems in the T-hangars, as well as drainage problems that exist on the portion of the apron adjacent to the fuel farm. Consultation with FBO management reveals that the drainage problems adjacent to the fuel farm results in standing water after every rainfall that lingers for extend durations. A rehabilitation and/or replacement project is required to bring the general aviation apron up to good condition and correct the identified drainage issues.

4.8 SUMMARY OF FACILITY REQUIREMENTS

The examination of the facility requirements revealed the following conclusions:

Airfield

- The existing airfield system provides sufficient hourly and annual capacity to meet projected aircraft operations throughout the study period.
- Existing and future airfield facilities associated with SPS should be designed to meet Airport Reference Code C-III design standards.
- The existing RSAs and OFAs for Runways 17/35 and 15C/33C meet FAA design standards.
- The existing runway length of 7,000 feet on Runway 17/35 is sufficient to accommodate regularly scheduled operations of regional jets and turbo-prop associated passenger service. Charter operations with larger aircraft such as the B-737 and the MD-80 are accommodated on Runway 15C/33C. No additional runway or increases of runway length are needed to accommodate existing or future aircraft operations.
- The existing runway widths are sufficient to meet demand and should be maintained.
- The strength of Runway 17/35 should be increased to accommodate regular operations by existing turbo-props such as the ATR-72, as well as potential future operations by 70-seat regional jets such as the CRJ-700. This will be accomplished during the planned reconstruction of this runway.
- Taxiway A pavements (which are not currently in the City's leasehold) should be considered for rehabilitation to enable this taxiway to be re-opened. Taxiway C pavements should be rehabilitated to accommodate use of air carrier aircraft and should be widened to a width of 60 feet.
- No improvements to navigation aids are required. Improvements to airfield lighting are required on Runway 17/35 and will be accomplished in conjunction with the runway's reconstruction.

- Improvements to apron lighting are needed to improve visibility on the commercial and general aviation apron.

- Improvements to fencing should be considered in conjunction with other terminal area projects to provide a consist level of security.

- No improvements to ATC facilities are required.

Terminal

- The amount of space in the existing passenger terminal is not sufficient to meet current or future levels passenger demand. In addition to being undersized to meet current demand levels, the existing structure is in poor condition and requires replacement.

- The terminal apron is not optimally configured or sized to accommodate both regularly scheduled passenger service and diversions of aircraft from DFW. Apron improvement should be considered in conjunction with proposed new terminal facilities.

- The weight bearing capacity of the terminal apron needs to be increased to accommodate use by air carrier aircraft. Pavement rehabilitation and/or replacement is also needed to improve existing pavement conditions.

Roadway Access and Parking

- The capacity of Armstrong Drive is sufficient to meet existing and future demand. No improvements are required.

- Existing public parking is sufficient to meet average day demand but is insufficient to meet peak-day demands. Expansion options will be examined in conjunction with new passenger terminal facilities.

- Existing short-term parking is insufficient to meet demand and should be expanded.

- Additional terminal curb should be considered in conjunction with new passenger terminal facilities to accommodate peak demand associated with charter flights and the need for a dedicated shuttle area.

Support Facilities

- Existing ARFF and fuel storage facilities are adequate to meet existing and future demand.

- The possibility of providing a consolidated rental car service facility should be explored.

General Aviation Facilities

- Additional open-bay and T-hangars are not required to meet demand for aircraft storage throughout the study period. However, parcels suitable for the construction of additional corporate hangar facilities should be identified.

- Improvements are required to improve the condition and drainage of the general aviation apron. Specific drainage issues to be resolved include flooding across the T-hangars and standing water near the fuel farm.

SECTION 5.0

Terminal Concept Development and Evaluation

5.0 TERMINAL CONCEPT DEVELOPMENT AND EVALUATION

5.1 INTRODUCTION

The results of Section 4.0 revealed that the primary need at Wichita Falls Municipal Airport (SPS) is a passenger terminal capable of meeting existing and future passenger needs in an efficient manner. As described in Section 2.0, the existing passenger terminal was constructed in 1959 and suffers from a variety of maintenance and functional issues. This section addresses options for the replacement of this facility with a modern terminal that will meet the space program described in Section 4.0.

The development of terminal concepts followed a multi-step process that began with the identification of suitable locations for a new passenger terminal. This was followed by an examination of possible terminal area options. These options identified possible configurations and orientations of an aircraft apron, passenger terminal, and parking facilities. From these options, the more promising options were identified and evaluated in greater detail. The conclusion of the process was the identification of a preferred terminal concept.

5.2 TERMINAL LOCATION ALTERNATES

As shown in **Figure 5-1**, two locations were considered for development of a new passenger terminal. The first location (referred to as Alternate 1) is the area southwest of the existing terminal building in the area currently occupied by the entrance roadway along with public and employees parking. The second location (referred to as Alternate 2) is located northwest of the existing terminal area behind Hangars 5 and 7 on Sheppard Air Force Base property that is not currently within the City's leasehold.

5.2.1 TERMINAL LOCATION ALTERNATE 1

With Alternate 1 the terminal buildings, apron, and automobile parking facilities are located in the area currently occupied by the existing passenger terminal facilities.

The advantages of this location include the following:

- Adequate area for terminal program.
- Roadway access is available and nearby.
- Utility services serving the existing terminal are available to serve the new terminal.

The disadvantages of this location include the following:

- Phased construction will be required to allow for on-going operation of the existing terminal facilities throughout construction of the new terminal.
- Future expansion may require removal of the existing terminal building.

5.2.2 TERMINAL LOCATION ALTERNATE 2

With Alternate 2 the terminal buildings, apron, and automobile parking facilities are located in an area that is currently undeveloped.

The advantages of this location include the following:

- Ease of construction; less existing infrastructure to impact design/construction.
- Can be constructed without impact to existing terminal operations.

The disadvantages of this location include the following:

- May not provide adequate space for the terminal program due to the runway safety area.
- Runway safety area may limit future expansion.
- Requires construction of long entrance roadway.
- Extension of utility services will be required to service the site.
- Requires new or amended lease agreement with Sheppard Air Force Base for a significantly larger area.

After consideration of the opportunities and constraints of each alternate, Terminal Location Alternate 1 was selected for further development because the majority of the area is already within the City's leasehold and its provides adequate space for the required facilities including aircraft apron, terminal building, roadways, and parking. The additional leasehold requirement is located between two areas already leased by the City (i.e., Taxiway C and the rental car parking lot) and consist of a vacant grass strip of land. This additional leasehold area should not have any affect whatsoever on Sheppard AFB operations and should be obtainable via a leasehold renegotiation.

5.3 TERMINAL AREA OPTIONS

After determining the preferred terminal location, five options for this area were developed, each of which incorporates its own set of opportunities and constraints. In developing these "Options," consideration was given to satisfying needs for aircraft parking, automobile parking, rental car agencies, and vehicular access roads to the terminal and other facilities, as well as their future expandability. Consideration was given to phased construction of a new terminal to enable continued use of the existing terminal during the construction process. All five options assume demolition of the existing terminal building after the new terminal facilities are completed.

Descriptions of the terminal options are provided in the following paragraphs.

5.3.1 TERMINAL AREA OPTION 1

With Option 1 a new terminal building would be located west of the existing terminal building in the area currently occupied by the main terminal parking lot. A new aircraft parking apron would be located to the northeast of the new terminal in the area currently occupied by the existing terminal as shown in **Figure 5-2**.

Alternate 1 (southwest and adjacent to existing terminal)
Pros:
-Adequate area for terminal program
-Road access is available and nearby
-Utility services should be available due to proximity to existing terminal
-Allows retaining existing terminal in operation during construction
Cons:
-Will require phasing of construction to maintain existing terminal operation
-Future expansion will require removal of existing terminal

Alternate 2 (northeast of existing terminal)
Pros:
-Greenfield site – ease of construction, no displacements
-Can be constructed without impacts to existing terminal operations
Cons:
-May not have sufficient area for the terminal program due to encroachment into military runway safety area.
-Military runway safety area may limit expansion
-Requires long entrance road
-Utility services will likely have to be extended to the site
-Requires new lease agreement with Shepard Air Force Base

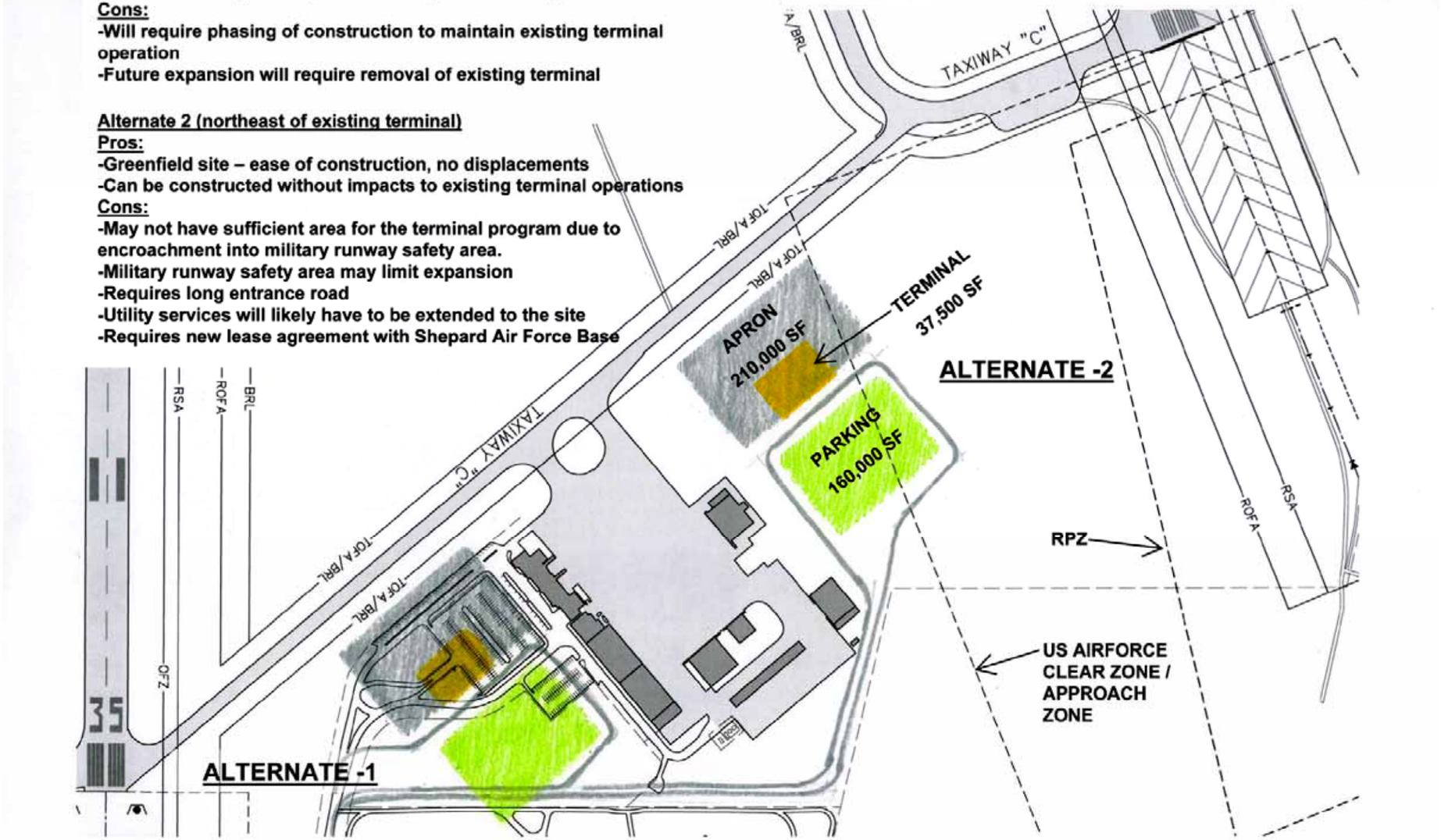


FIGURE 5-1
TERMINAL LOCATION ALTERNATIVES

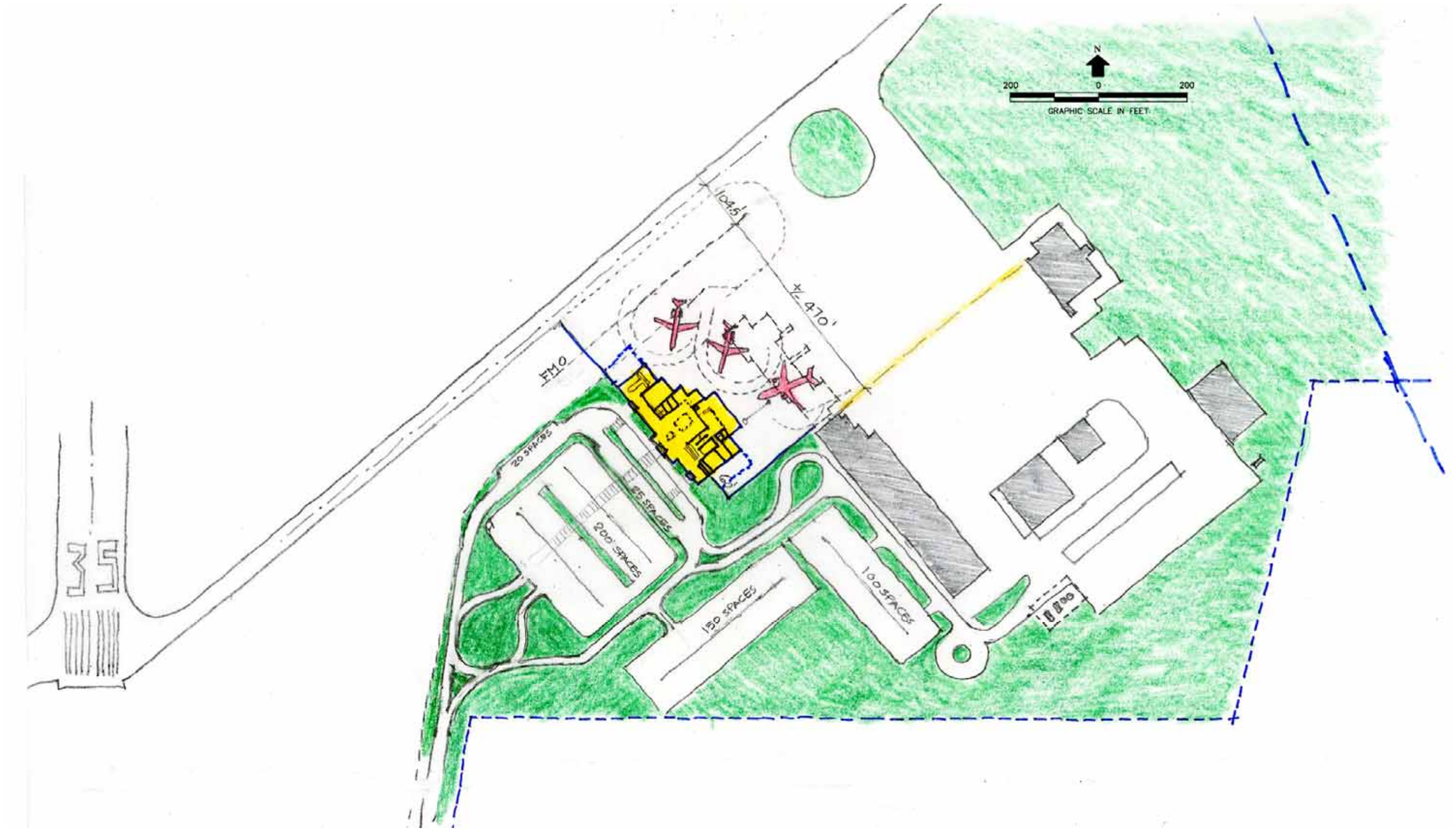


FIGURE 5-2
TERMINAL AREA OPTION 1

A new public parking lot would be constructed southwest of the existing public lot. A portion of this lot and associated roadways would be located outside of the City's current leasehold area. Therefore, the current lease would need to be renegotiated to attain the required property. The need to renegotiate the lease applies to all options discussed in the following paragraphs.

New, larger overflow/employee parking lots would be constructed in the area currently occupied by the existing employee/overflow lot. These new lots would serve as overflow, employee, and rental car storage lots. A new loop roadway system would be constructed to serve the new terminal, parking lots, and the existing non-terminal facilities east of the new terminal.

5.3.2 TERMINAL AREA OPTION 2

Option 2 proposes a new terminal building, aircraft parking apron, and large automobile parking lot located west of the existing terminal. A portion of existing Taxiway "C" would be reconfigured to allow clearance for the new terminal and apron configuration as depicted in **Figure 5-3**. Unlike Option 1, this option requires changes to the airfield and would also include a more significant revision to the City's leasehold area.

Option 2 proposes additional automobile parking for overflow and employee use southeast of the new terminal. A new loop roadway system would serve the new terminal, parking lots, and the existing non-terminal facilities east of the new terminal facility.

5.3.3 TERMINAL AREA OPTION 3

Option 3 proposes the construction of a new terminal building, aircraft parking apron, and large automobile parking lot southwest of the existing terminal building as depicted in **Figure 5-4**. The terminal and parking lot are arranged in a dogleg configuration to maximize aircraft apron clearance between the terminal and Taxiway "C." Additional automobile parking for overflow and employee use would be constructed south of the new terminal. The configuration of the parking is dictated by the remaining space between the proposed terminal and the limits of the City's leasehold. The terminal's roadway system would be modified accordingly to provide access to the parking areas and provide sufficient curbside space and short-term parking.

5.3.4 TERMINAL AREA OPTION 4

Option 4 is depicted in **Figure 5-5**. It is similar to Option 3 in terms of terminal placement, but proposes a passenger terminal that has a more linear configuration that facilitates easy expansion if needed in the future. Aircraft access to the apron would occur directly from Taxiway "C."

The main automobile parking lot and associated terminal driveway are configured as a dogleg to maximize parking lot area. Additional automobile parking for overflow and employee use would be constructed south of the new terminal. The proposed roadway system, a new loop roadway system, would serve the new terminal, parking lots, and the existing non-terminal facilities east of the new terminal facility.

5.3.5 TERMINAL AREA OPTION 5

Option 5 is depicted in **Figure 5-6**, it proposes a new terminal building, aircraft parking apron, and large automobile parking lot located west of the existing terminal building. A portion of existing Taxiway "C" would be re-located to allow clearance for the new terminal and apron. The existing terminal parking lot would be expanded and the existing terminal access road modified to serve the new terminal and parking lot.

5.3.6 REVIEW OF TERMINAL AREA OPTIONS

Each of the five options were presented and discussed with airport management on September 4th, 2009. The advantages and disadvantages of each concept were discussed in terms of expandability, impacts to existing operations, ease of phasing, impacts of airfield operations, and other factors. Some notable issues included the fact that Options 1, 2, and 5 have limited expansion capability due to adjacent facilities (hangars) or taxiways. Conversely, Options 3 and 4 have good expansion capabilities.

In terms of impacts to airfield operations, Options 2 and 5 would require changes to the alignment of Taxiway "C" that would require permission from the Base Commander. The acceptability of this change is not known and potentially could change over the duration of the planning and design process.

Options 3, 4, and 5 were deemed to have superior phasing characteristics compared to Options 1 and 2, due to their lower level of adverse impacts on passenger and airside operations. In light of these general conclusions, it was determined that Options 3 and 4 appeared to have superior characteristics.

5.4 REFINEMENT OF TERMINAL AREA OPTIONS

Terminal Area Options 3 and 4 were selected for additional refinement to investigate their potential to meet the Master Plan Update's goals and objectives. In developing Option 4, three sub-options (4A, 4B, and 4C) were identified. These Options are differentiated by varying second floor configurations (4A and 4B) and a single-story scheme (4C). Detailed site plans, building floor plans, building sections, site phasing plans, and cost estimates were prepared for both options including the three variations of Option 4.

Descriptions of the terminal building layouts for these two Options are as follows.

5.4.1 TERMINAL BUILDING - TERMINAL AREA OPTION 3

Site Plan, Ground and Second Floorplans, and Building Section drawings of Terminal Area Option 3 are depicted in **Figures 5-7, 5-8, 5-9, and 5-10**, respectively.

The site plan was optimized to provide an aircraft parking apron that accommodates two regional jets and/or commuter turboprop size aircraft and one charter aircraft (e.g., B-737/MD-80) simultaneously. The clearance from Taxiway "C" was established to accommodate up to a B-757 sized aircraft even though that aircraft does not currently operate at the Airport. This separation should provide adequate protection for aircraft that may conceivably have the need to use this taxiway in the future.

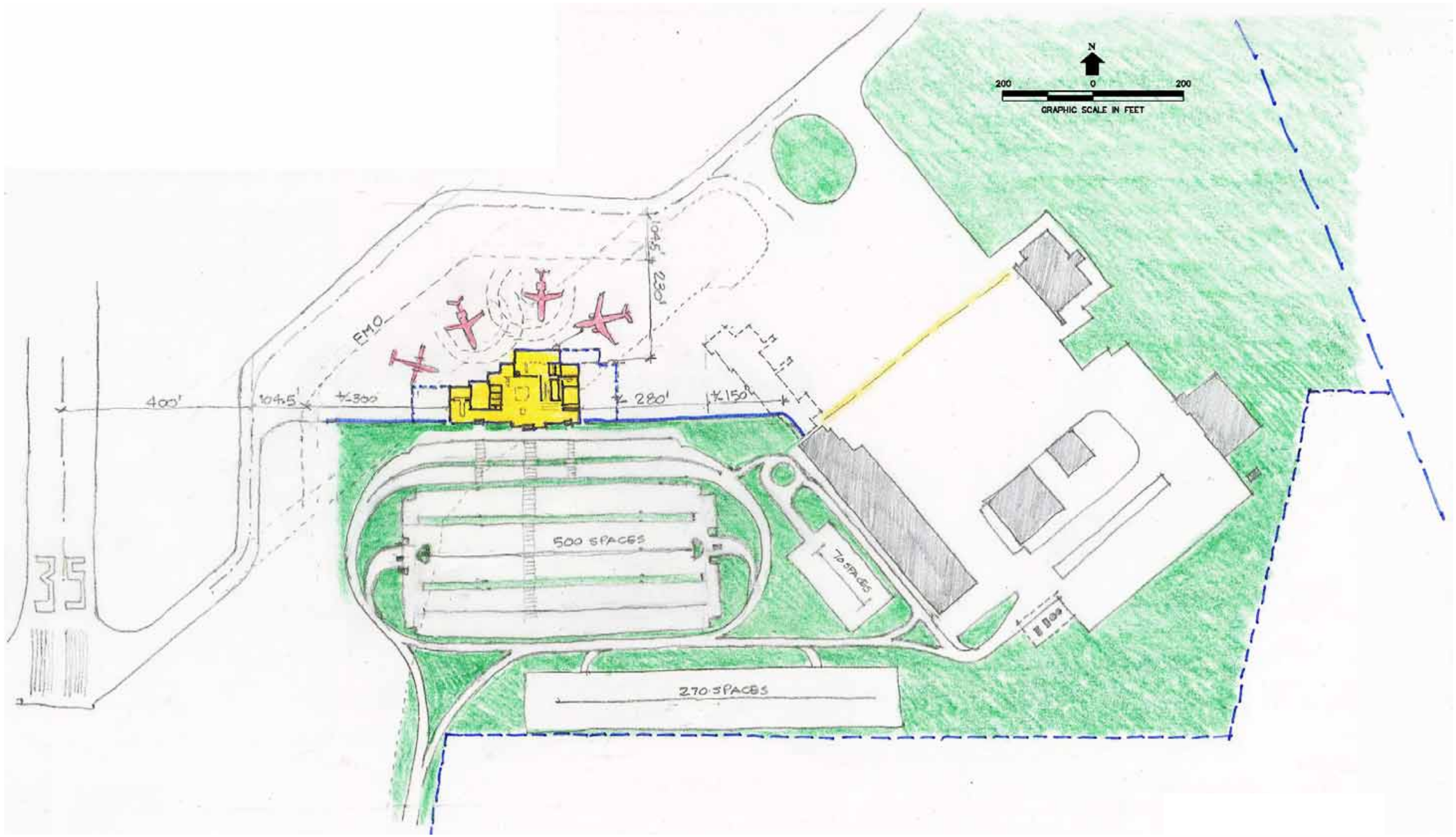


FIGURE 5-3
TERMINAL AREA OPTION 2

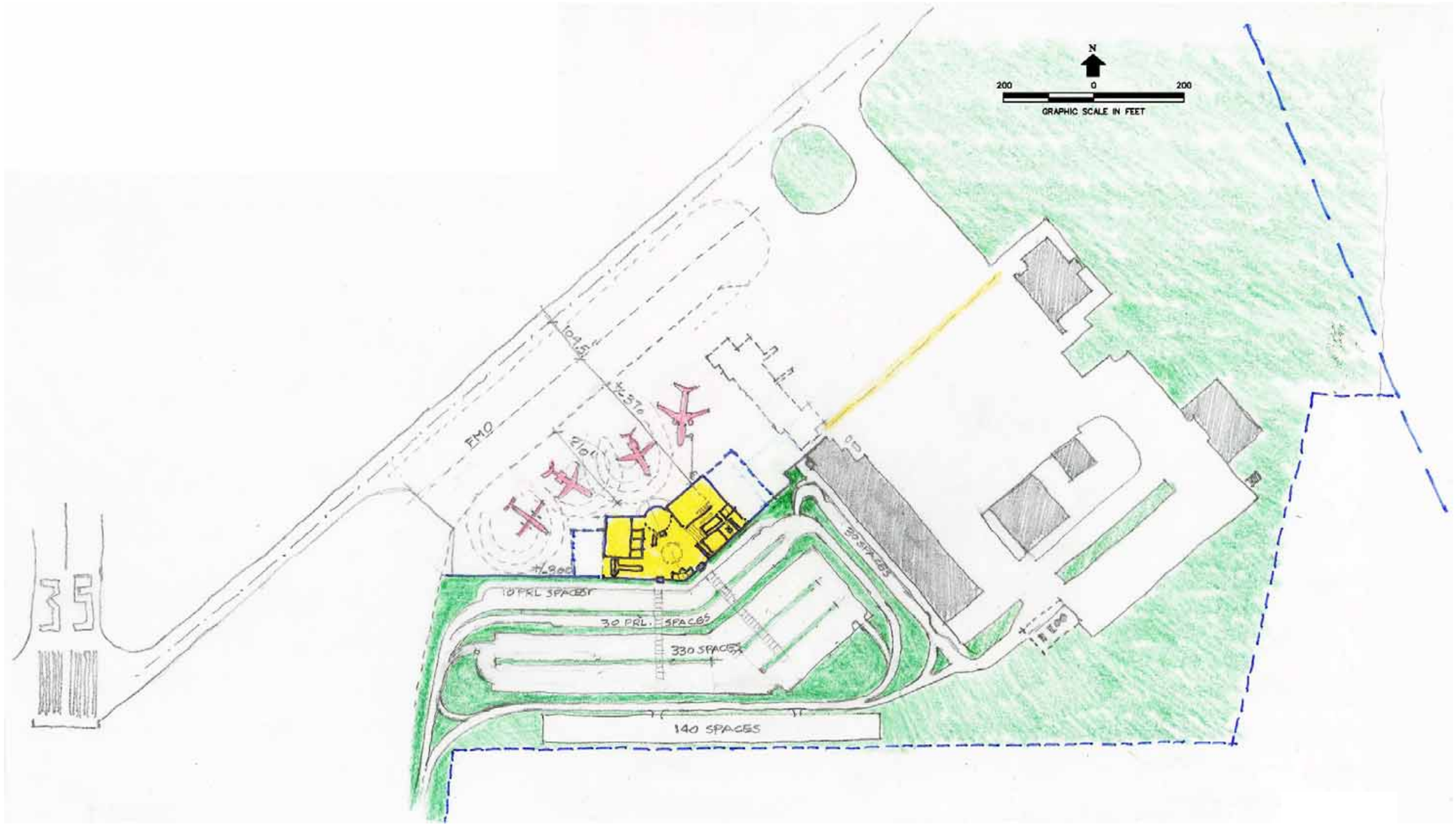


FIGURE 5-4
TERMINAL AREA OPTION 3

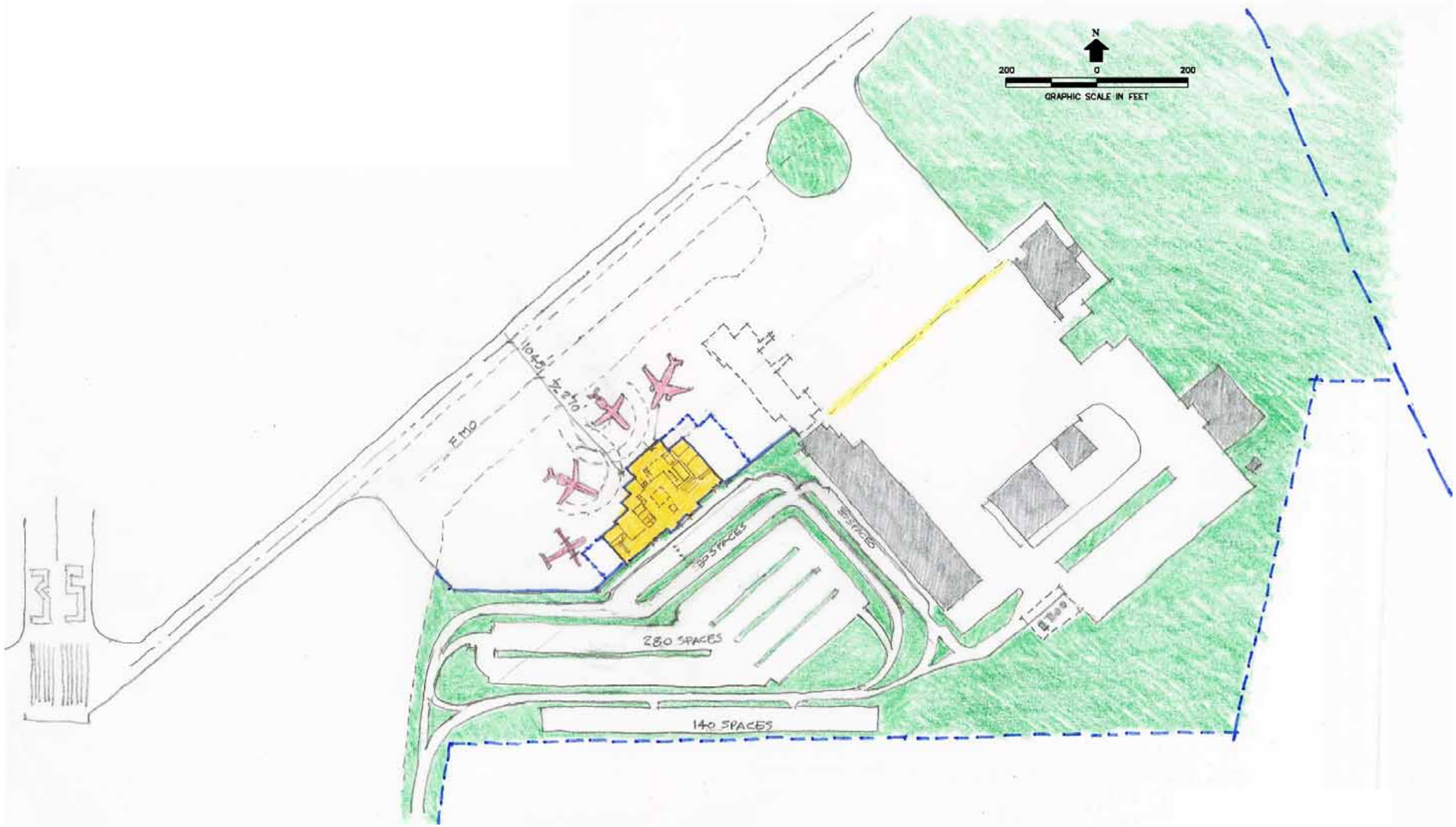


FIGURE 5-5
TERMINAL AREA OPTION 4

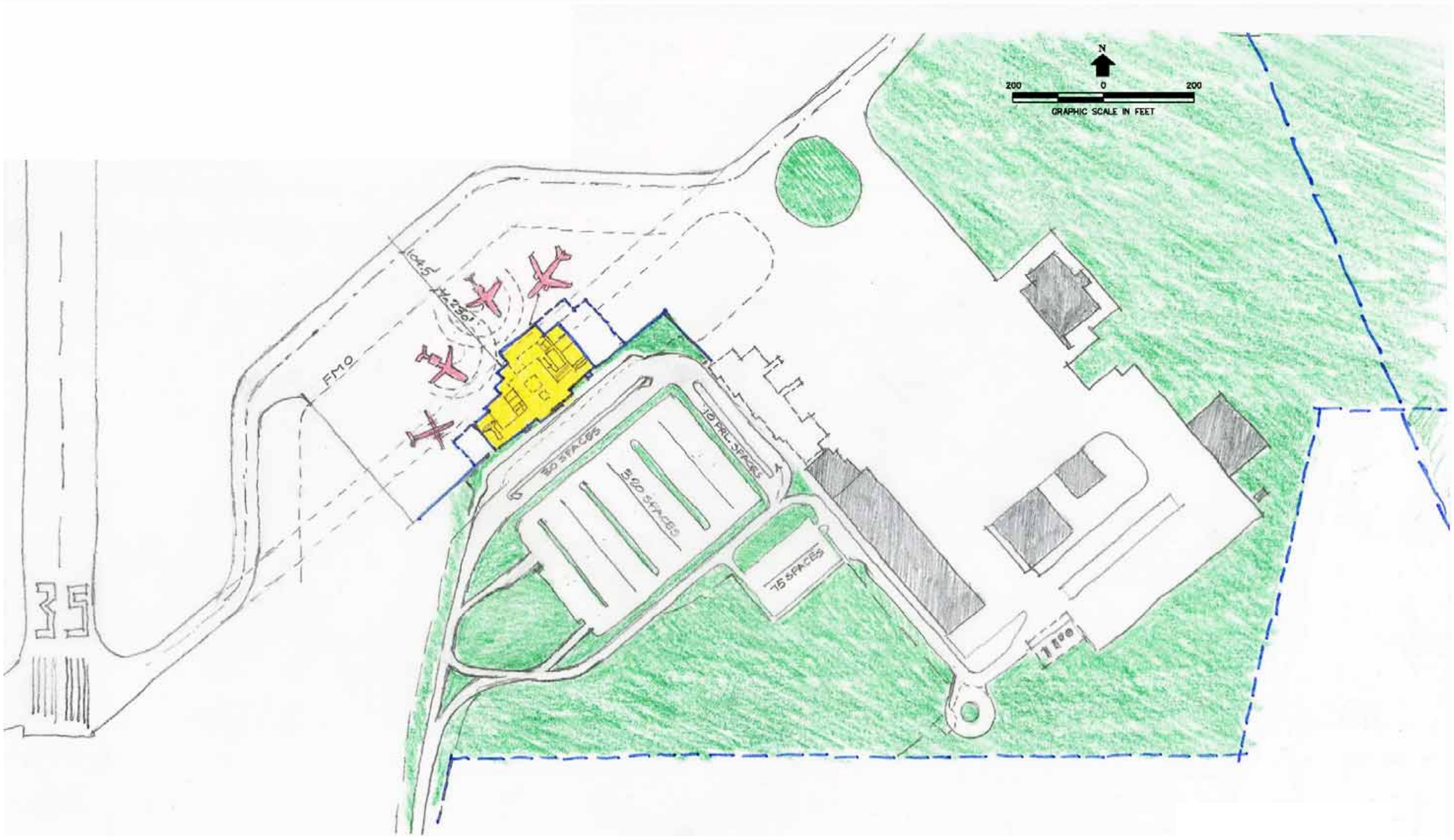


FIGURE 5-6
TERMINAL AREA OPTION 5

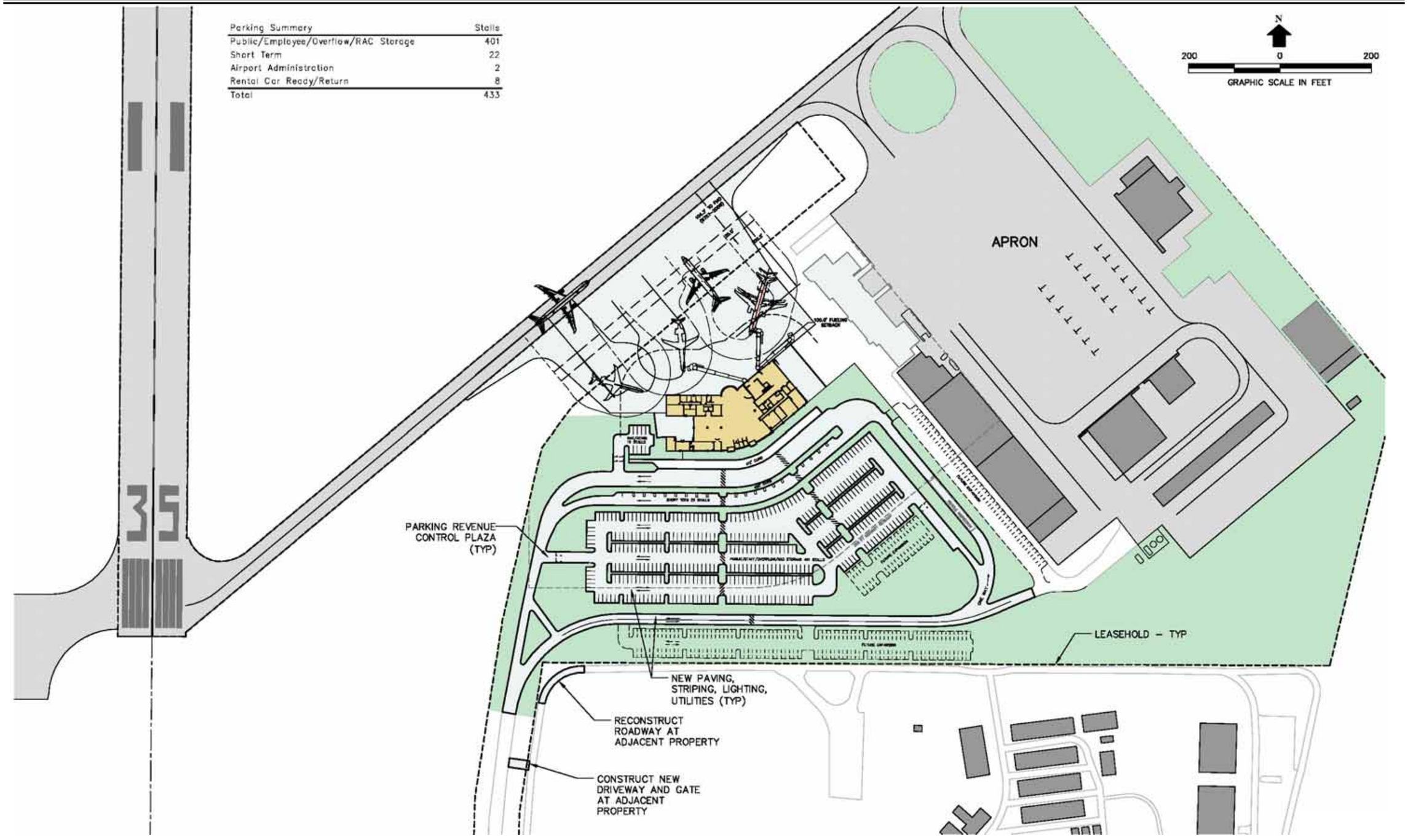


FIGURE 5-7
OPTION 3 – SITE PLAN

FIGURE 5-8
OPTION 3 – GROUND FLOOR PLAN

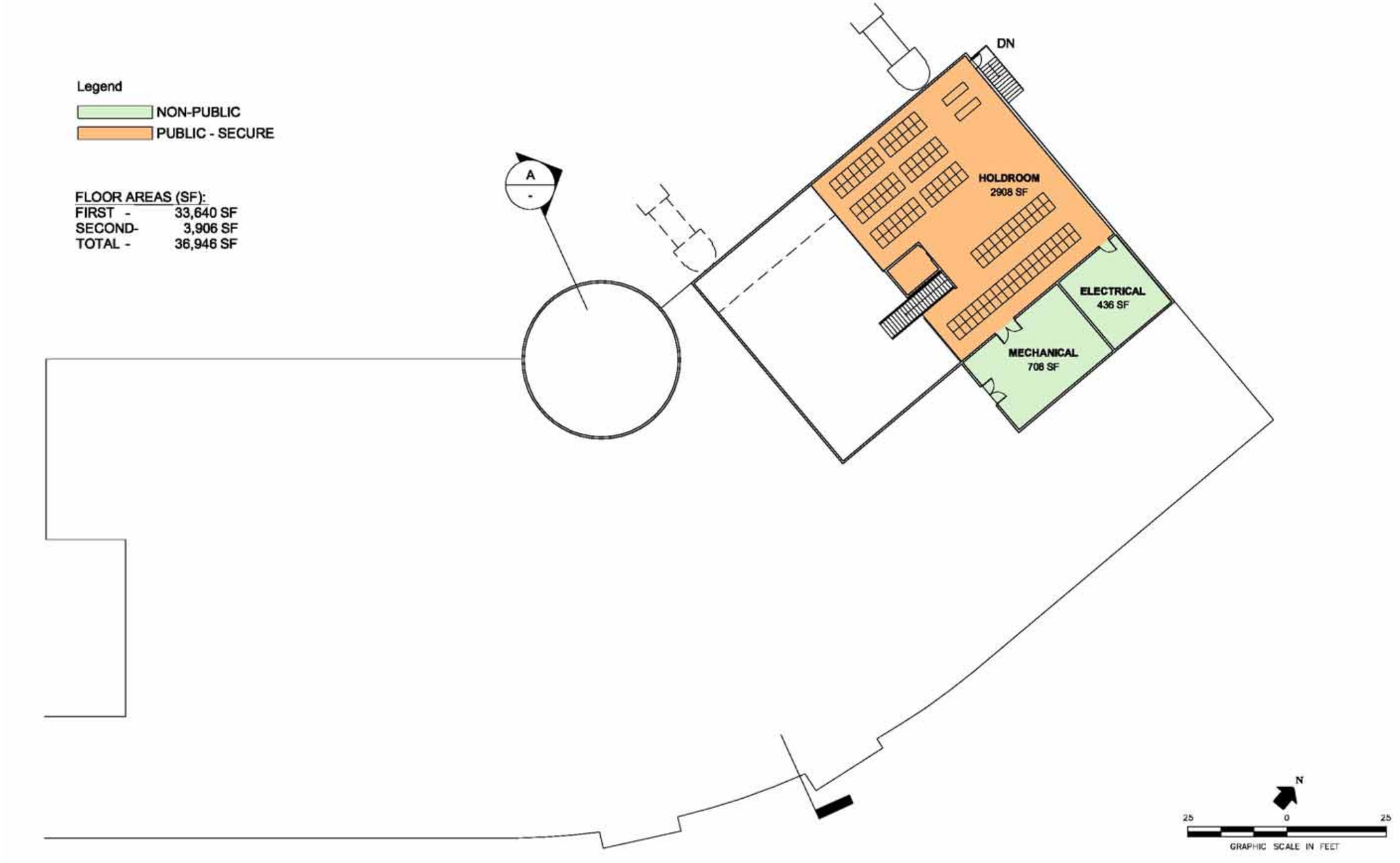


FIGURE 5-9
OPTION 3 – SECOND FLOOR PLAN

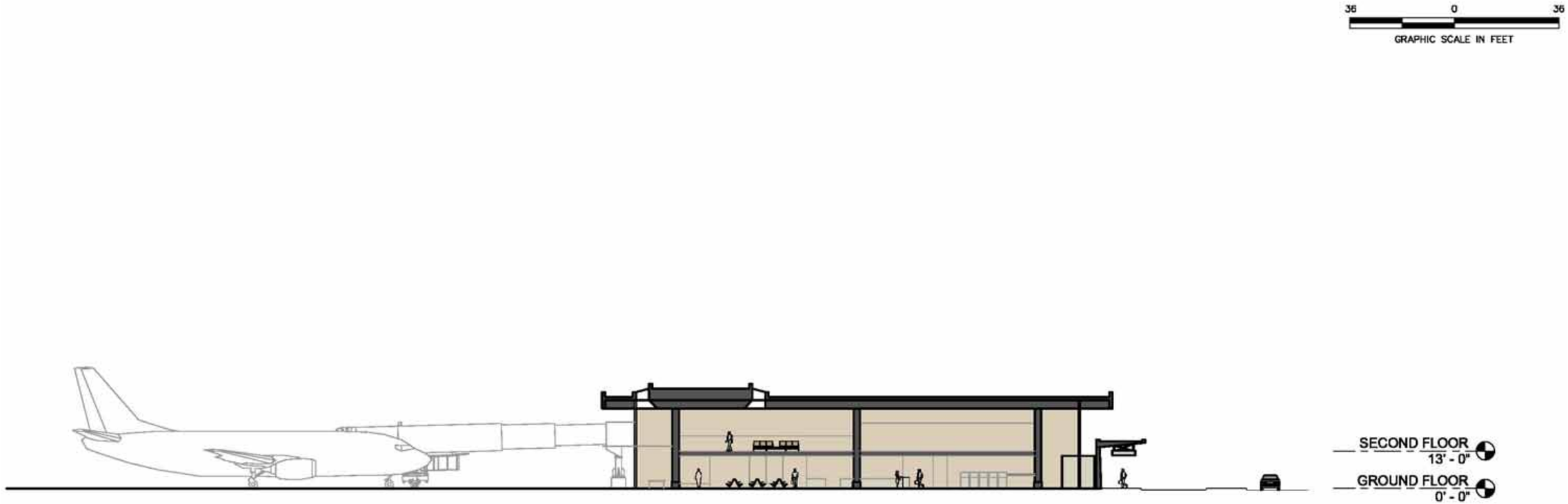


FIGURE 5-10
OPTION 3 – BUILDING SECTION

The site plan also provides for a loop access road that would accommodate long-term parking in a central area. Short-term parking can be accommodated along a secondary curb in front of the passenger terminal. Rental car parking would be accommodated on the baggage claim side of the passenger terminal. Access to Landmark Aviation would occur directly from the loop roadway.

All major terminal elements are conveniently located adjacent to a central lobby area. Airline ticket counters are located on the east side of the lobby near the entrance; baggage claim is located to the west. Car rental agencies are between two entry vestibules at the south wall of the lobby. The central lobby extends from the entry vestibules entirely through the building to the airside where a glass wall offers views of the airfield. Concession areas, holdrooms, and administrative offices flank this portion of the lobby.

Passenger Flow

Departing passengers arrive at the terminal curb, unload, and proceed to ticketing and baggage check. Once passengers have obtained a boarding pass and checked baggage, they can use any facilities in the central lobby (e.g., concessions) and then proceed to the passenger screening checkpoint. Following the checkpoint, passengers enter a ground floor lobby with two gate podiums. Exterior doors at the podiums offer at-grade access to the apron for enplaning/deplaning passengers. A second-floor holdroom is accessible by elevator or stairway. This gate lobby is connected to a passenger boarding bridge, providing a direct, enclosed path to the aircraft.

Passengers deplaning ground boarded aircraft walk across the ramp and enter the gate lobby through the gate doorways. Passengers arriving on aircraft served by boarding bridges descend to the ground level gate lobby by stair or elevator. From the gate lobby, arriving passengers proceed through the central lobby to baggage claim and rental car counters, as necessary, and exit the terminal to the curb or parking area.

Baggage Flow

Outbound baggage would be transported by conveyor from ticket counter to a baggage screening room behind the airline offices. After screening by an Explosives Detection System (EDS), baggage is conveyed to the baggage make-up area on the east side of the building. From there, baggage is transferred on tug and cart to aircraft.

Inbound baggage would be transferred from aircraft to a flat-plate baggage claim device located on the west side of the terminal. A driveway on this side of the terminal serves a partially enclosed area where baggage handlers unload baggage directly to the claim device.

5.4.2 TERMINAL BUILDING - TERMINAL AREA OPTION 4A

Site Plan, Ground and Second Floorplans, and Building Section drawings of Terminal Area Option 4A are depicted in **Figures 5-11, 5-12, 5-13, and 5-14**, respectively. Ticketing facilities are located on the east side of the building, baggage claim and rental car agencies on the west. Other passenger services are accessed via a central public lobby. The central lobby extends from the entry vestibules entirely through the building to the airside where a glass wall offers views of the airfield. Concession areas, restrooms, and a stairway serving second floor administrative offices are conveniently located adjacent to the central lobby.

Passenger Flow

Departing passengers arrive at the terminal curb, unload, and proceed to airline ticketing and baggage check. After check-in, passengers can use any facilities in the central lobby (e.g., concessions) and then proceed to the passenger security checkpoint. Following checkpoint, passengers enter a ground floor lobby with two gate podiums. Exterior doors at the podiums provide at-grade access to the apron for enplaning/deplaning passengers. A second-floor holdroom is accessible by elevator or stairway. This gate lobby is connected to a passenger boarding bridge providing a direct, enclosed path to the aircraft.

Passengers deplaning ground boarded aircraft walk across the ramp and enter the gate lobby through the gate doorways. Passengers arriving on aircraft served by boarding bridges descend to the ground level gate lobby by stair or elevator. From the ground level lobby, passengers proceed through the central lobby to baggage claim and rental car counters, as necessary. Passengers exit the front of the terminal and proceed to the terminal curb or parking area.

Baggage Flow

Outbound baggage would be transported via conveyors from the ticket counter area to a baggage screening room located behind the airline offices. After being screened by ETD or EDS, baggage would proceed to a baggage make-up area located at the northeast side of the building. From there the baggage would be loaded onto carts for delivery to aircraft.

Inbound baggage would be transported from aircraft to a flat-plate baggage claim device located at the west side of the terminal building. Baggage tugs/carts would enter an inbound baggage enclosure where baggage handlers would unload baggage directly to the claim device.

5.4.3 TERMINAL BUILDING - TERMINAL AREA OPTION 4B

Site Plan, Ground and Second Floorplans, and Building Section drawings of Terminal Area Option 4B are depicted in **Figures 5-11**, **5-15**, **5-16**, **and 5-17**, respectively. In most respects, Option 4B is identical to Option 4A as described above. The main difference being that in Option 4B the administrative office suite is located at ground level rather than the second floor as in Option 4A.

Passenger Flow

Passenger flow in Option 4B would be identical to Option 4A – see description of Option 4A passenger flow above.

Baggage Flow

Baggage flow in Option 4B would be identical to Option 4A – see description of Option 4A passenger flow above.

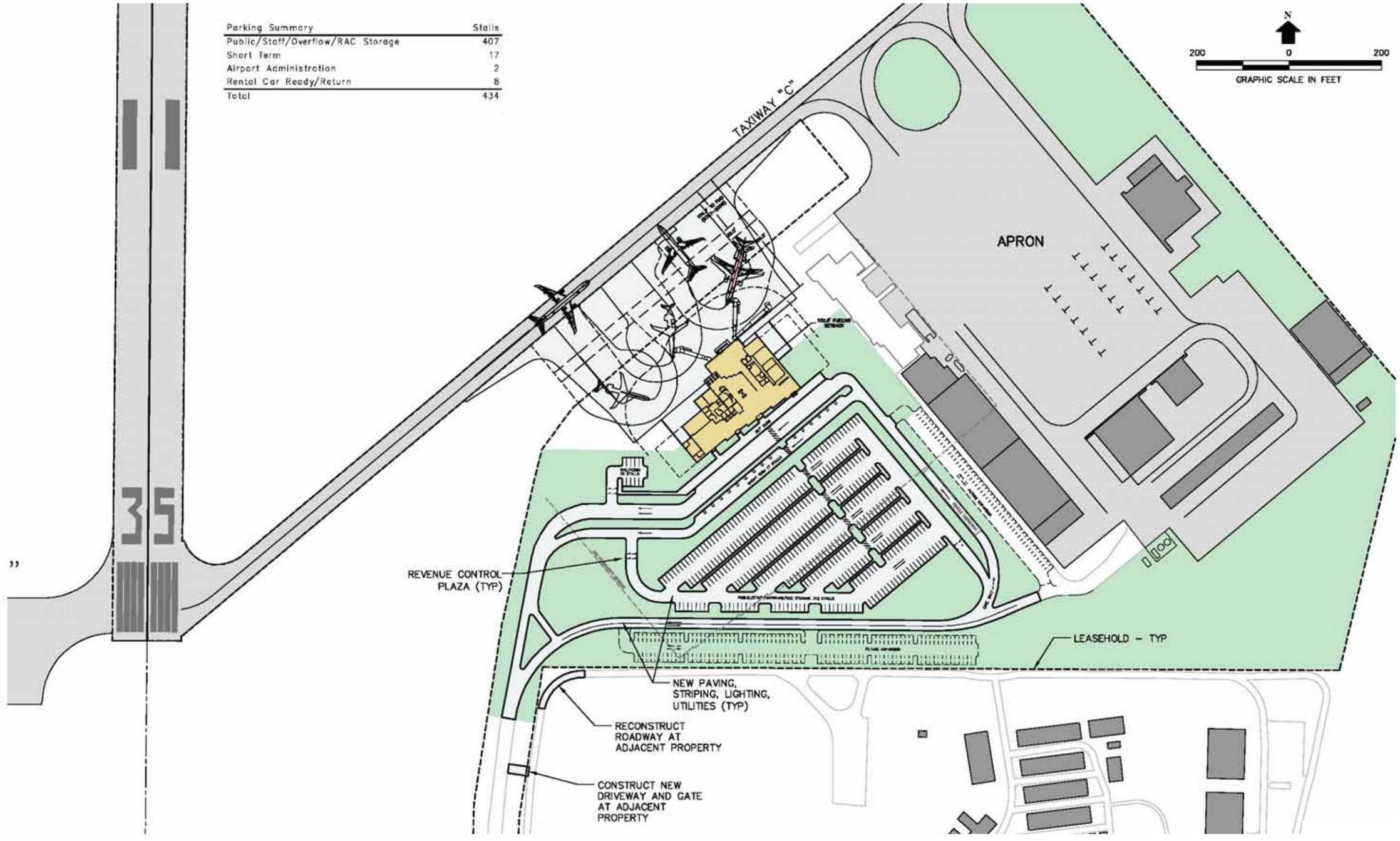


FIGURE 5-11
OPTION 4A/4B/4C – SITE PLAN

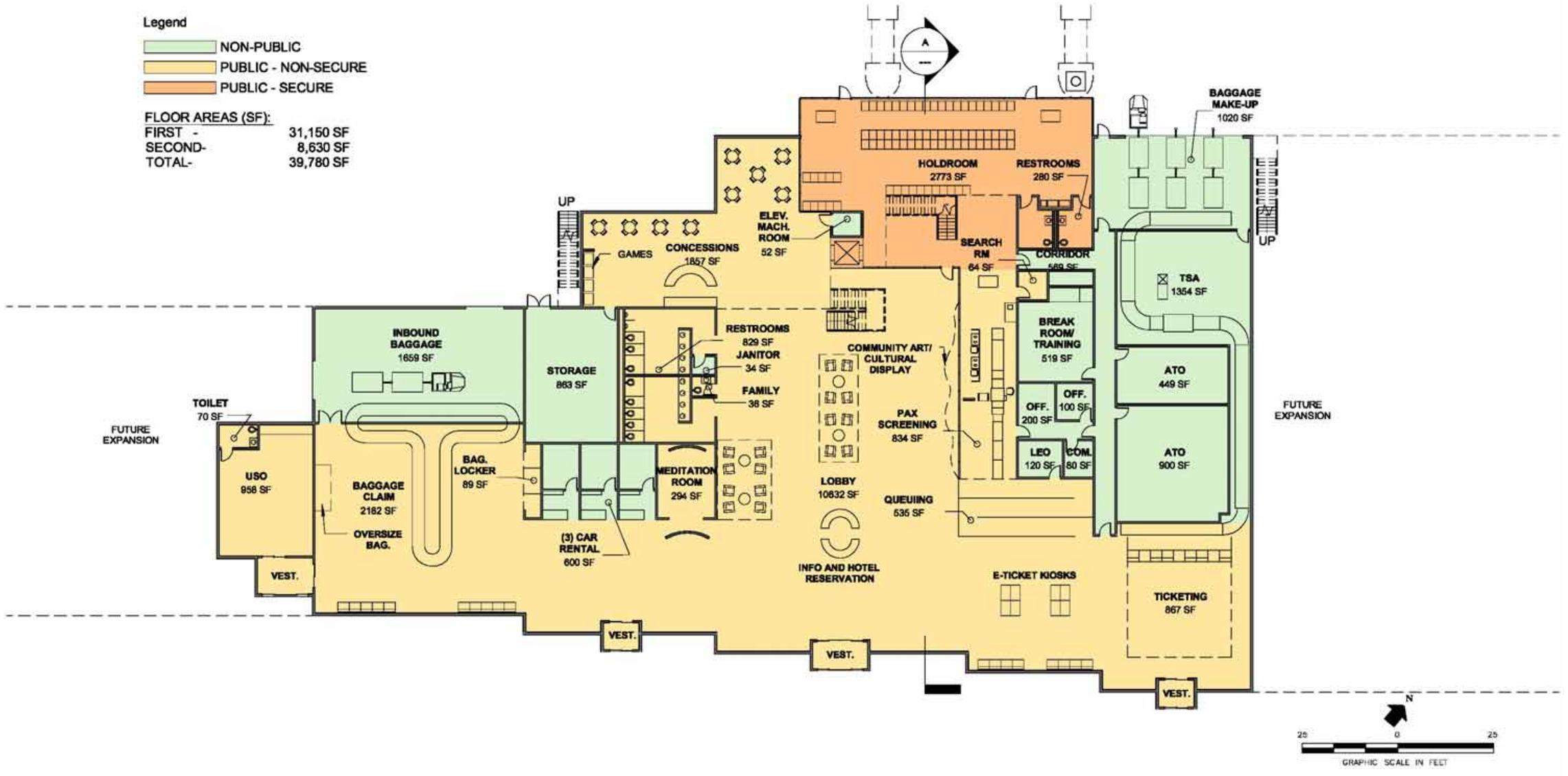


FIGURE 5-12
OPTION 4A – GROUND FLOOR PLAN

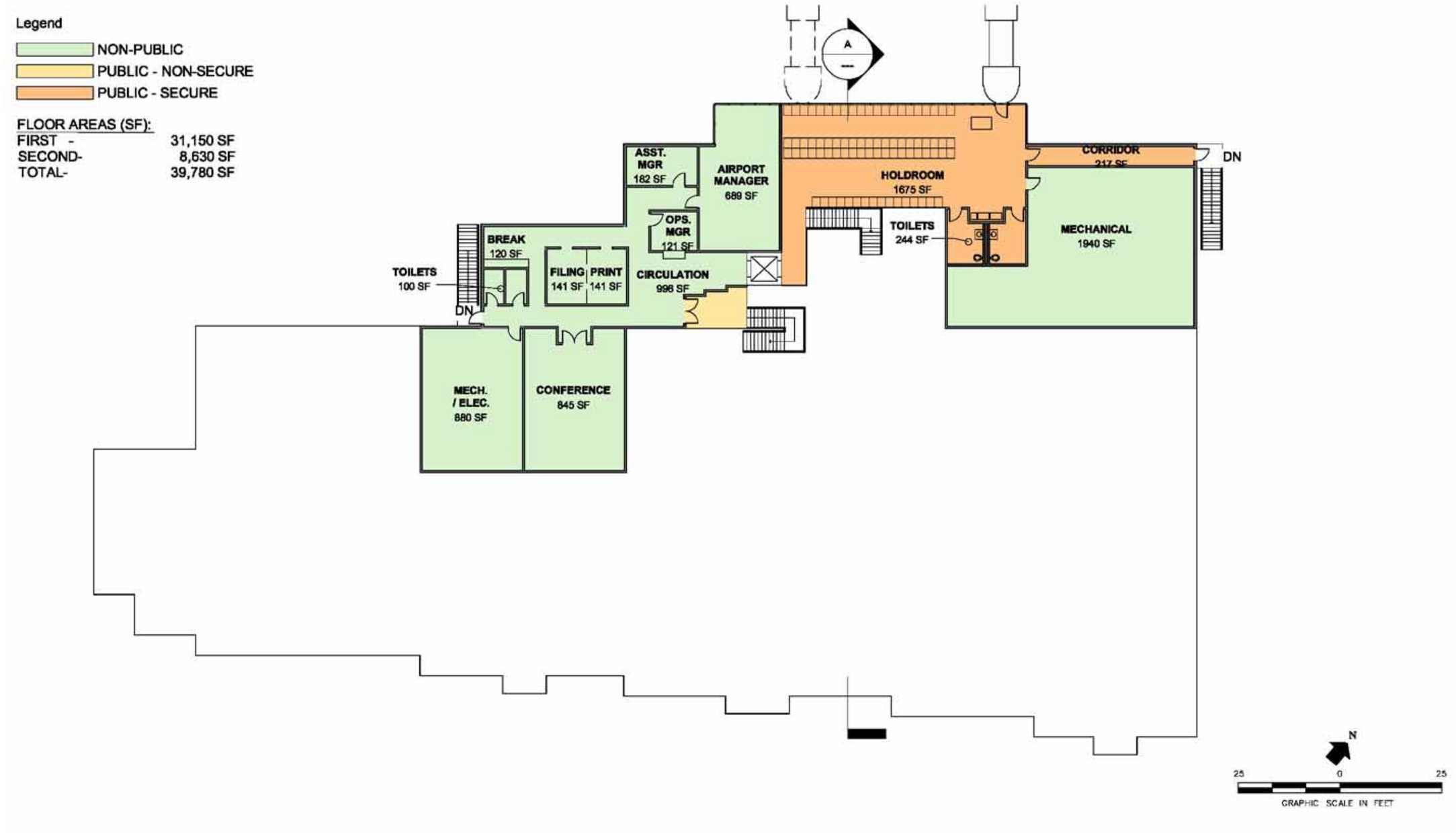


FIGURE 5-13
OPTION 4A – SECOND FLOOR PLAN

FIGURE 5-14
OPTION 4A – BUILDING SECTION

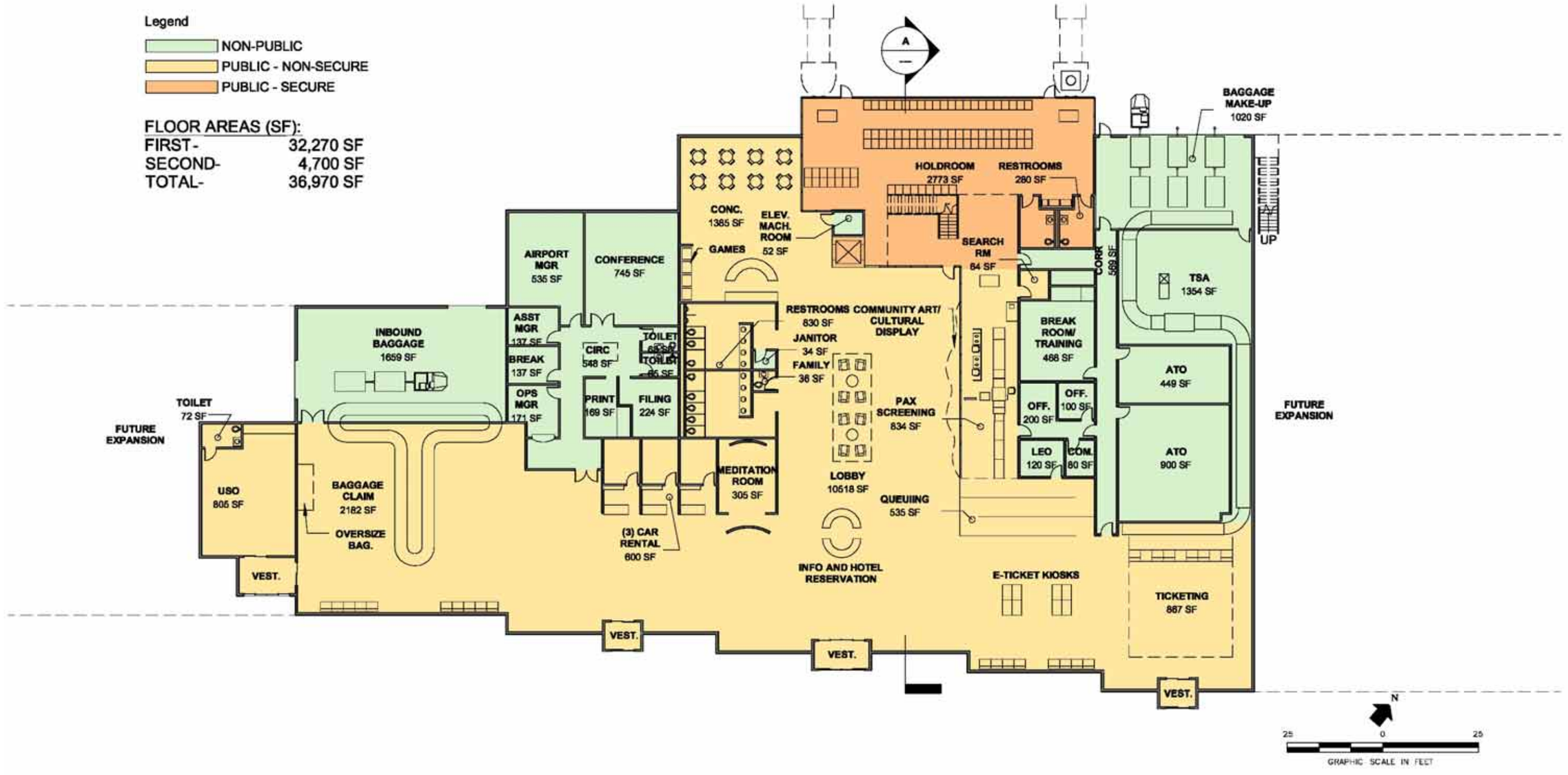


FIGURE 5-15
OPTION 4B – GROUND FLOOR PLAN

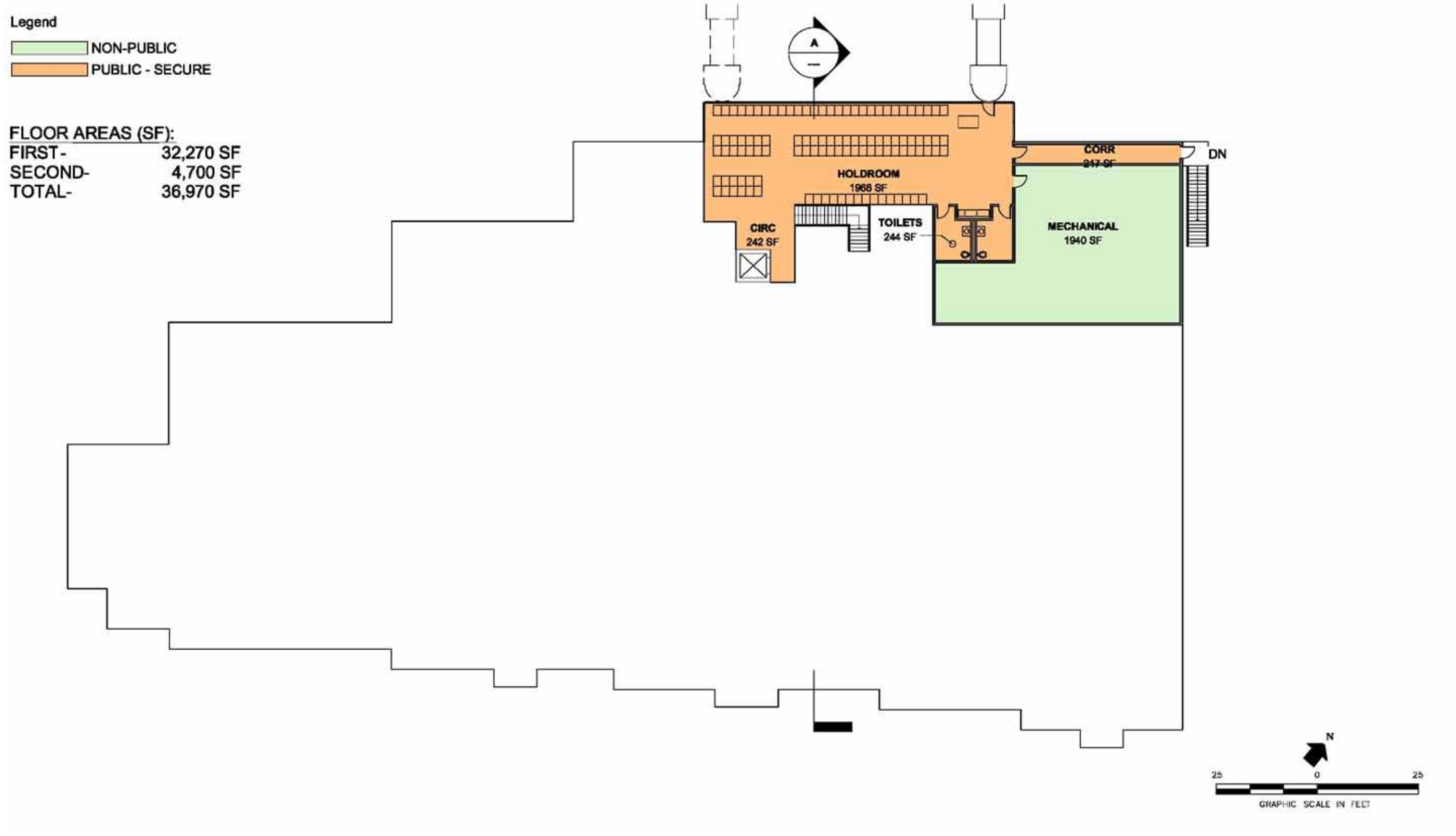


FIGURE 5-16
OPTION 4B – SECOND FLOOR PLAN

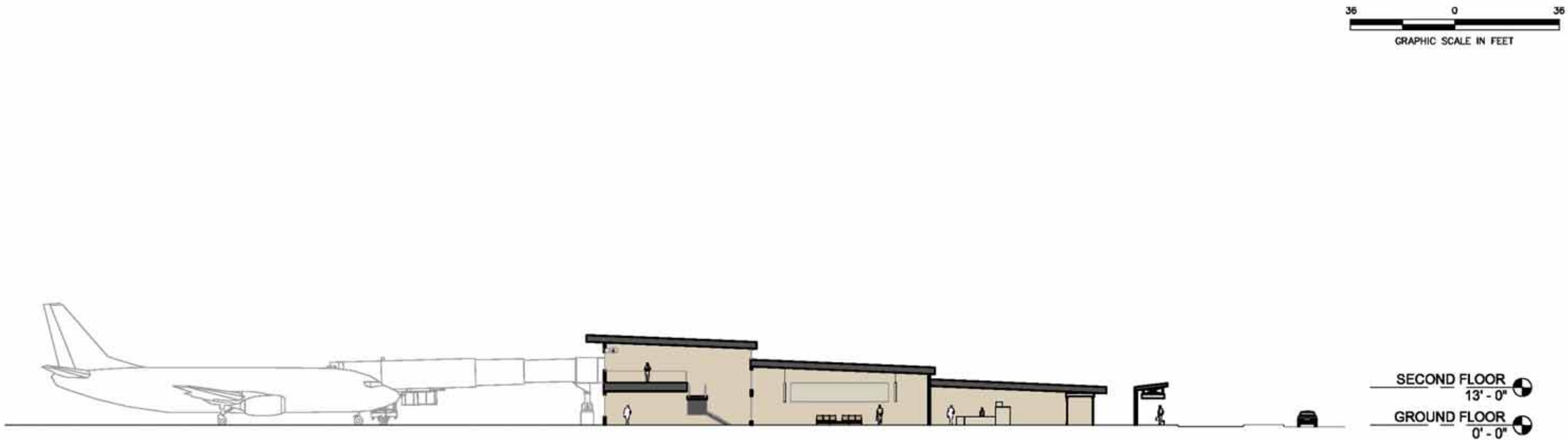


FIGURE 5-17
OPTION 4B – BUILDING SECTION

5.4.5 TERMINAL BUILDING - TERMINAL AREA OPTION 4C

Site Plan, Ground Floorplan, and Building Section drawings of Terminal Area Option 4C are depicted in **Figures 5-11**, **5-18**, **and 5-19**, respectively. In most respects, Option 4C is identical to Option 4A. A major difference being that all Option 4C facilities (including all gate lobby space and the administrative office suite) are located on the ground floor. In addition, in Option 4C the ground floor surface is raised 4 feet above the apron level; this will allow use of a passenger boarding bridge from the ground level gate lobby. To facilitate aircraft boarding directly from the apron, an outdoor ramp and stairway connect the gate lobby with the lower apron level.

Passenger Flow

Passenger flow in Option 4C is identical to Option 4A with one exception: all passenger flow is through the ground floor gate lobby; there is no need for a stair/elevator to access the passenger boarding bridge. However, all passengers not using the boarding bridge will need to use the outdoor ramp and stair to travel between apron level and the gate lobby.

Baggage Flow

Baggage flow in Option 4C would be identical to Option 4A with one exception: since the ground level of Option 4C is above apron level, ramps are necessary for baggage vehicles to access the make-up and claim devices.

5.5 EVALUATION OF TERMINAL AREA OPTIONS

Terminal Area Options 3, 4A, 4B, and 4C present a variety of benefits. Both objective and subjective criteria are used to evaluate the benefits each terminal concept would provide to passengers, airlines, and other airport tenants. A matrix showing the results of this evaluation appears at the end of this section.

5.5.1 EVALUATION CRITERIA

Terminal Area Options were evaluated based on the following criteria:

- Satisfaction of Program Requirements – The extent to which the Option achieves the spatial program requirements and project objectives.
- Flexibility – How easy or difficult it would be to change or adapt the terminal and/or surrounding facilities in response to future growth and expansion needs.
- Expandability – The ability of the terminal building to be expanded in the future with minimal disruption to airport operations, passenger convenience, and to the architectural integrity of the building.
- Passenger Convenience – The level of convenience that the terminal provides passengers in terms of space allocation, transparency of functions, user friendliness, etc.
- Construction Phasing – The capability of being built in a logical sequence while minimizing disruption of airport operations and maintaining the safety and convenience of airport users.
- Construction Cost – The estimated cost of constructing the proposed terminal facilities including aircraft aprons, roadways and automobile public parking. The costs include capital and program requirements (i.e., engineering, inspection and management). Both 2010 base year (without inflation adjustment) and escalated costs are presented for the planned 2010-2012 development period.
- Operating Cost – The annual cost of operating the terminal including maintenance, utilities, supplies, and personnel.
- Architectural Expression – The potential for developing the proposed concept with an architectural expression that relates to the community of Wichita Falls without compromising functional requirements.
- Debt Funding Requirements – Debt funding may be required for each terminal concept because available funding sources are insufficient in timing and amount to support development of the new terminal area during the planned time frame (2010-2012). Lower debt funding requirements indicated a higher ranking for this evaluation criteria.
- City Economic Development Funding Needed – The financial analysis indicated that additional funds from City Economic Development sources would be needed to finance terminal design costs and to meet debt service requirements when other funding sources are unavailable. Lower levels of City Economic Development funding needs indicated a higher ranking for this evaluation criteria.

5.5.2 PRELIMINARY COST ESTIMATE

As a basis for evaluating relative construction costs, preliminary construction cost estimates were prepared for Terminal Area Options 3, 4A, 4B, and 4C. The estimates include construction costs for the terminal building, apron, airside facilities, roadway improvements, and automobile parking lots. Program management, permit fees, and design costs are also included along with design and construction contingencies. The estimates reflect construction costs current as of 2010; they do not include any adjustment for escalation (or de-escalation) of construction costs over time. The cost estimates are based on unit costs derived from historical bid data, and unit cost data publications produced by R.S. Means. Program costs include design fees, contingency, and owner soft costs. **Table 5-1** provides a summary of costs per option with a breakdown by each element (i.e., terminal, parking, aircraft apron, etc.)

TABLE 5-1
COST ESTIMATE SUMMARY FOR TERMINAL OPTIONS

Cost Element	Option 3	Option 4A	Option 4B	Option 4C
Terminal	21,618,000	21,314,000	19,843,000	19,404,000
Roads/Parking	3,142,000	3,164,000	3,164,000	3,164,000
Aircraft Apron	5,794,000	5,319,000	5,319,000	5,319,000
Utilities	959,000	959,000	959,000	959,000
Total	**$31,513,000**	**$30,756,000**	**$29,285,000**	**$28,846,000**

Source: URS Corporation, 2009.

5.5.3 PRELIMINARY FINANCIAL ANALYSIS

A preliminary financial analysis was conducted to assess the likely funding requirements of each terminal option and to assess their relative advantage or disadvantage from a financial perspective.

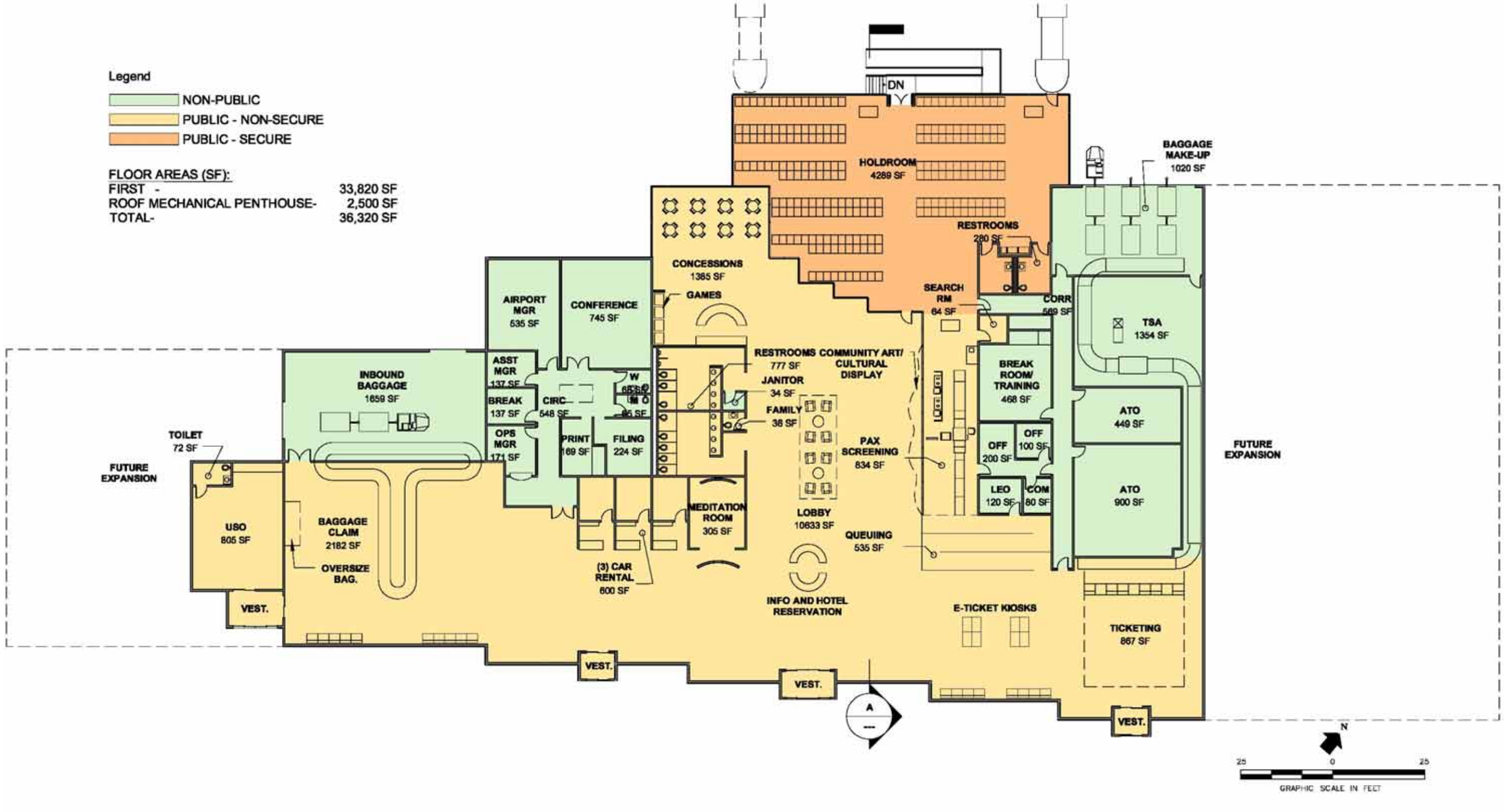


FIGURE 5-18
OPTION 4C – GROUND FLOOR PLAN

FIGURE 5-19
OPTION 4C – BUILDING SECTION

The first step in the preliminary financial analysis was to generate escalated costs for the project based upon an estimated design and construction schedule. An annual inflation factor of 4 percent beginning in 2011 was applied to all components of each terminal option. **Table 5-2** presents a summary of the escalated costs.

TABLE 5-2
SUMMARY OF BASE YEAR AND ESCALATED TERMINAL DEVELOPMENT COSTS

Capital Costs	Option 3	Option 4A	Option 4B	Option 4C
2010 Base Year Costs	$31,513,000	$30,756,000	$29,285,000	$28,846,000
Escalated Costs (4% Inflation)	33,237,391	32,438,968	30,887,475	30,424,453
Cost Increase Due to Inflation	$1,724,391	$1,682,968	$1,602,475	$1,578,453

Source: Leibowitz & Horton AMC, 2010.

Preferred scheduling for all terminal development components includes design activities in 2010 with construction completed by 2012. As indicated in Table 5-2, the total capital cost increase due to inflation adjustments is approximately $1.6 to $1.7 million for the four terminal options.

Once escalated costs were determined for each option, potential capital funding sources were identified and estimated. Potential sources include a combination of Federal and local dollars as well as airport revenues. Descriptions of the funding sources are provided in Section 9.0 - Financial Plan. **Table 5-3** presents a summary of potential sources of capital funding for each terminal option.

As Table 5-3 indicates, the significant majority of funding would be from the airport's projected annual entitlement funds from the FAA Airport Improvement Program (AIP) through about 2032. This assumes airport management would seek reimbursement (through AIP entitlements) of funds spent to construct the terminal beyond the 20-year time frame of this master plan. The second largest source of funding would be from an anticipated AIP discretionary grant for airside improvements included in each terminal option. Unlike AIP entitlement funding (which is earned by the Airport based on annual enplanement levels realized), it should be noted that AIP discretionary funding is not certain until the FAA actually provides a grant agreement. The balance of funding may consist of a combination of passenger facility charges, City Economic Development Funds (sales tax based) and airport cash reserves/net revenues.

If these funding sources are insufficient to cover the project's cost, then "other" unidentified funding sources may be necessary to cover the outstanding balance. These unidentified funding sources may include private third-party funds, including funds for terminal naming rights.

TABLE 5-3
SUMMARY OF SOURCES AND USES OF CAPITAL FUNDING
FOR THE TERMINAL DEVELOPMENT OPTIONS

Sources of Capital Funding	Uses of Capital Funding			
	Option 3	Option 4A	Option 4B	Option 4C
AIP Entitlements	$22,466,136	$22,025,580	$20,967,778	$20,478,512
AIP Discretionary	5,179,255	4,703,313	4,703,313	4,703,313
Passenger Facility Charges	1,455,021	1,406,784	1,351,110	1,325,359
City Economic Development Funds	3,000,000	3,000,000	3,000,000	3,000,000
Cash Reserves/Net Revenues	1,136,979	1,303,292	865,275	917,269
Total Sources/Uses	$33,237,391	$32,438,968	$30,887,475	$30,424,453

Note: Addition errors are due to rounding of calculated amounts.
Source: Leibowitz & Horton AMC, 2010.

The last step in the preliminary financial analysis was to assess the levels of debt funding and City Economic Development funding required to support implementation of the terminal development project. These items were calculated on the basis of permanent funding needs, debt service requirements and positive cash flow requirements. **Table 5-4** presents the results of this analysis for each of the terminal options. It should be noted that debt funding and the use of City Economic Development funding would require City Council approval.

TABLE 5-4
DEBT AND OTHER FINANCIAL CONSIDERATIONS

Other Financial Issues	Option 3	Option 4A	Option 4B	Option 4C
Required Debt Principal	$23,562,000	$23,256,000	$21,624,000	$21,216,000
Annual Debt Service	$1,804,318	$1,780,885	$1,655,911	$1,624,667
City/Economic Development Funding to Support Debt Service	$6,100,000	$5,900,000	$4,900,000	$4,500,000

Source: Leibowitz & Horton AMC, 2010.

5.5.4 EVALUATION MATRIX

Due to the large number of evaluation criteria considered and the need to easily compare one alternative to another, an evaluation matrix was developed and is shown in **Table 5-5**. For each criterion, the matrix assigns a value to each of the four options. Possible values are "+" for Options that have a positive relationship to the criteria; "-" for Options with a negative relationship to the criteria; and "0" for Options where the criteria is not impacted either positively or negatively.

Following is a discussion of how the Options perform relative to these criteria.

- Program Requirements – All four Options provide facilities that satisfy the requirements of the facility program; none has a significant advantage or disadvantage in meeting this regard.
- Flexibility - Due to the linear character of its floorplan, the Option 4 terminal building (including variations A, B, and C) has an advantage over Option 3. With Option 3, enlargement of ticketing, bag screening/make-up, and baggage claim functions would require expanding the building toward the terminal curb. The Option 3 site plan provides adequate space for a doubling of capacity for these facilities. However, since construction of the expansion would occur immediately adjacent to heavily used passenger facilities, it is more likely to require special provisions to accommodate continued terminal use during construction. Expansion of Option 4 would require construction at the far ends of the building – further from passenger facilities.
- Expandability – Again, due to their linear nature, the Option 4 schemes enjoy an advantage. While Option 3 can accommodate a doubling of ticketing, bag screening/make-up, and baggage claim functions. Option 4 offers the potential for more than doubling the capacity of these elements.
- Passenger Convenience – Since it does not require stair/elevator access to the passenger boarding bridge, Option 4C has a clear advantage. All other Options include a second story gate lobby and associated travel up/down the stairs/elevator for passenger access to the enclosed boarding bridge. The advantage is somewhat offset by the stair/ramp required for ground-boarding in Option 4C. However, since a smaller vertical rise is involved, Option 4C is still more convenient for passengers.

TABLE 5-5
TERMINAL OPTIONS EVALUATION

EVALUATION CRITERIA	Terminal Option 3	Terminal Option 4a	Terminal Option 4b	Terminal Option 4c
Program Requirements – *The extent to which the plan achieves the spatial program requirements and project objectives.*	+	+	+	+
Flexibility – *How easy or difficult it would be to change or adapt the terminal and/ or surrounding facilities in response to future growth and expansion needs.*	-	+	+	+
Expandability – *The ability of the terminal to be expanded in the future with minimal disruption to airport operations, passenger convenience, and to the architectural integrity of the terminal.*	-	+	+	+
Passenger Convenience – *The level of convenience that the terminal provides passengers in terms of space allocation, transparency of functions, user friendliness, etc.*	0	0	0	+
Construction Phasing – *The capability of being built in a logical sequence, while minimizing disruption of airport operations and maintaining the safety and convenience of airport users.*	+	+	+	+
Estimated Construction Cost – *The cost of constructing the proposed terminal facilities, including roadways, parking, and airside improvements.*				
Terminal	**21,618,000**	**21,314,000**	**19,843,000**	**19,404,000**
Airside	**$5,794,000**	**$5,319,000**	**$5,319,000**	**$5,319,000**
Landside	**3,142,000**	**3,164,000**	**3,164,000**	**3,164,000**
Utilities	**959,000**	**959,000**	**959,000**	**959,000**
Total	**$31,513,000**	**$30,756,000**	**$29,285,000**	**$28,846,000**
Operating Cost – *The annual cost of operating the terminal including maintenance, utilities, supplies and personnel.*	0	0	0	+
Architectural Expression – *The potential for developing the proposed concept with an architectural expression that relates to the community of Wichita Falls, without compromising functional requirements.*	+	+	+	+
Debt Funding Requirements – *The need for and amount of debt financing required to construct the passenger terminal complex.*	$23,562,000	$23,256,000	$21,624,000	$21,216,000
City Economic Development Funding – *The need for, and amount of, Economic Development Funding to assist debt service requirements.*	$6,100,000	$5,900,000	$4,900,000	$4,500,000
+ Clear Advantage	**3/+**	**5/+**	**5/+**	**7/+**
0 Neutral	**2/0**	**2/0**	**2/0**	**0/0**
- Clear Disadvantage	**2/-**	**0/-**	**0/-**	**0/-**

- Construction Phasing – All four Options can be constructed without major disruption to operations of the existing terminal. Large portions of the new parking lot will be constructed in areas away from existing operations. Moreover, once constructed, these parking areas can be used to provide parking for the existing terminal while the new terminal is built in the area occupied by the existing parking area. Areas of contractor activity can easily be isolated from on-going passenger terminal activity.

- Estimated Construction Cost – The single-story Option (4C) has the lowest estimated construction cost. The single-story Option 4C configuration eliminates the need for stairways and elevators, which is a significant cost savings. By eliminating these elements, the single story configuration contributes to a spatial efficiency that leaves Option 4C with the smallest overall floor area of any Option. The reduced floor area contributes to the lower overall construction cost of the Option 4C building. There will be some increased cost associated with raising the ground floor level above apron level but these increases will be more than offset by the savings resulting from the single-story configuration.

- Operating Cost – By eliminating maintenance costs associated with the second-story restrooms and elevator, Option 4C has an advantage in reduced maintenance costs.

- Architectural Expression – All four Options have strong potential for development of a pleasing and expressive design.

- Debt Funding Requirements – Debt funding requirements range from $23.5 million to $21.2 million for the four terminal options with Option 4C providing the lowest debt required and most favorable alternative by about $2.3 million.

- City Economic Development Funding Needed – City Economic Development funding needs range from $6.1 million to $4.5 million for the four terminal options with Option 4C providing the lowest funding need and most favorable alternative by $1.6 million.

A summary of the relative merits of each Option is provided at the bottom of Table 5-5 in the form of a total of “+,” “0,” and “-” for each Option. The summary clearly suggests that Option 4C is the best Option for further development.

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